HORNBILL

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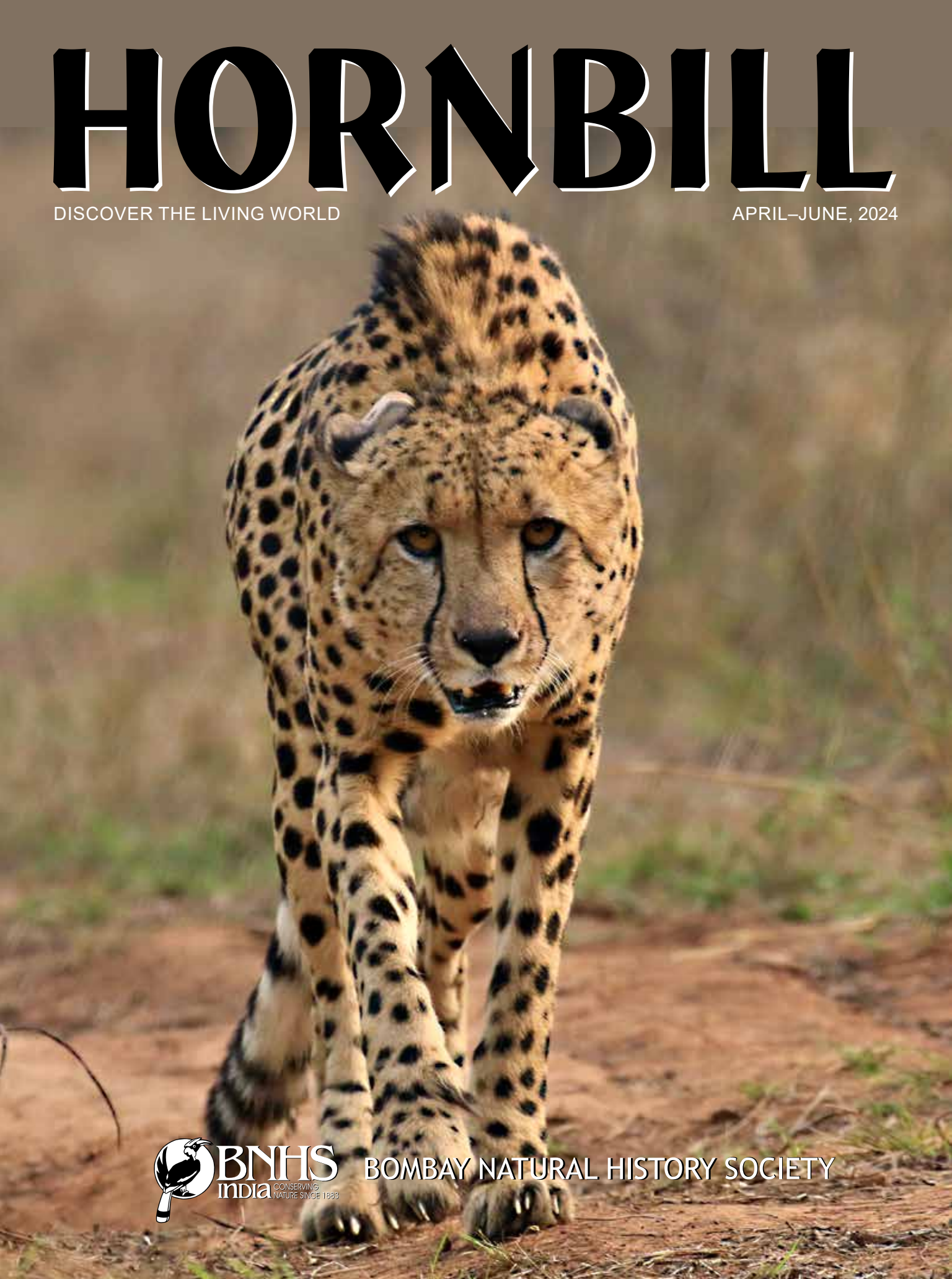
APRIL–JUNE, 2024



BNHS INDIA CONSERVING NATURE SINCE 1883

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April–June 2024

Cover: A lone free ranging Namibian male cheetah exploring his new surroundings in KNP by Y.V. Jhala

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Editorial...

In June BNHS lost two long-time supporters and friends – Dr A.J.T. Johnsingh, a regular contributor to *Hornbill* and an exceptionally talented wildlife scientist and conservation naturalist, and Dr G.V. Reddy a visionary Forest Officer dedicated to wildlife conservation. Our regular writer, Dr A.J.T. Johnsingh, is no longer with us. *Hornbill* pays homage to the departed souls and treasures their contributions.

The monsoon might have caused problems in some cities, but it brought new life to landscapes that received rain in July. Gamini, a female cheetah in Kuno National Park, Madhya Pradesh, must be delighted for her six cubs that were born in March. The monsoon breeze must be relaxing for them and their mother. Cheetahs usually give birth to four or five cubs, so six is exceptional. The cheetah project in Madhya Pradesh has been in the media for various reasons, and *Hornbill* readers likely have many questions.

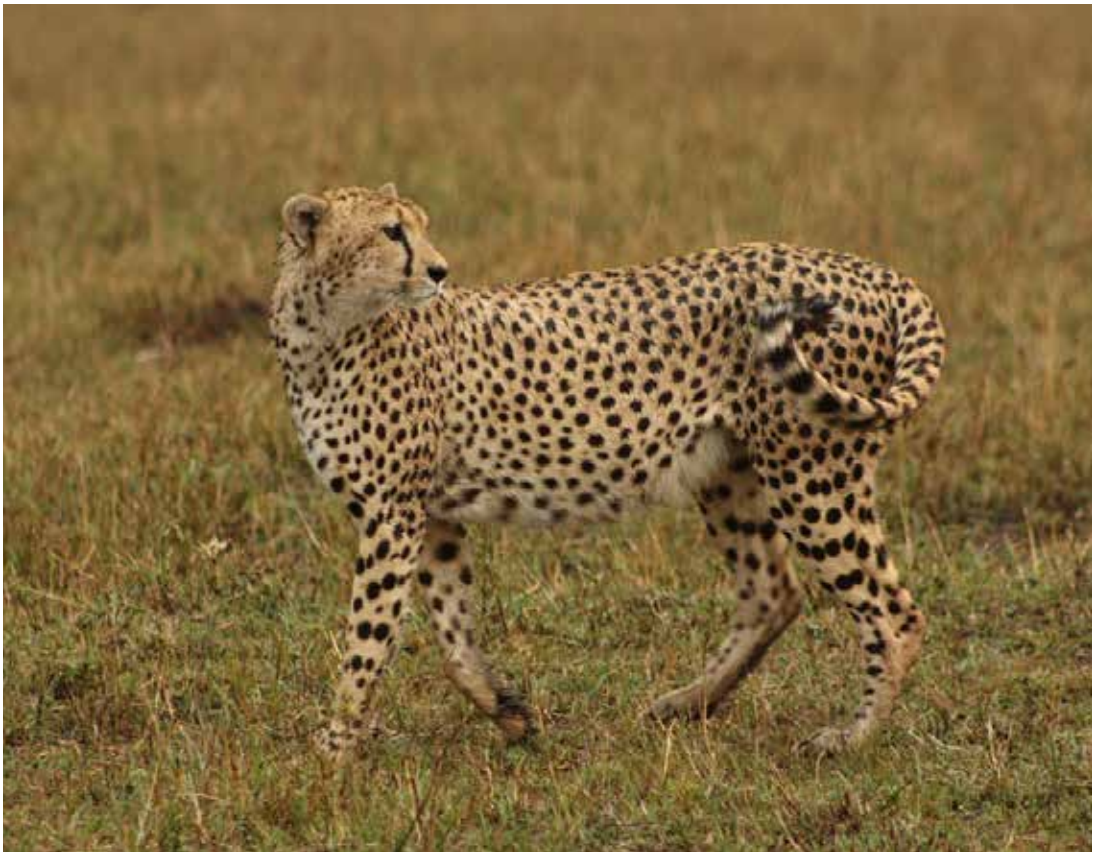
I initially remained silent on this project because several lesser-known species, like the great Indian bustard (GIB) and the lesser and bengal florican, are on the verge of extinction and receive little attention. Why should we spend resources on a species that has already gone extinct in India? However, some believe that the cheetah reintroduction will focus the government's attention on India's grassland habitats. If so, it will benefit grasslands and grassland species, including our birds. Hence, we decided to invite cheetah experts to share their viewpoints in *Hornbill*.

Who better than Dr Divyabhanusinh to speak and write about cheetahs? His passion and deep understanding make him a valuable contributor. He visited Hornbill House, and I invited him to participate in the debate. He could not refuse because of his love for me and BNHS. We also approached Dr Y.V. Jhala from the Wildlife Institute of India (WII), who led the initial team for the cheetah project. BNHS and Dr Jhala have a strong bond, as he became a BNHS life member during his schooling in Mumbai, and BNHS sponsored his Ph.D. I believe this issue of *Hornbill* will be worth preserving and sharing widely.

In the special feature, Dr Divyabhanusinh writes about the history of cheetahs in India, and Dr Y.V. Jhala reflects on one year of the Cheetah Reintroduction Programme.

Former BNHS Director Dr Asad R. Rahmani reviews two books, MORE THAN JUST FOOTNOTES and WOMEN IN THE WILD. I am sure you will want to buy them after reading his reviews.

You will find interesting information on the recent sighting of a blue and white flycatcher by Sachin Pawar and a Jerdon's baza by Vijaya Bharat in Reader's Space.



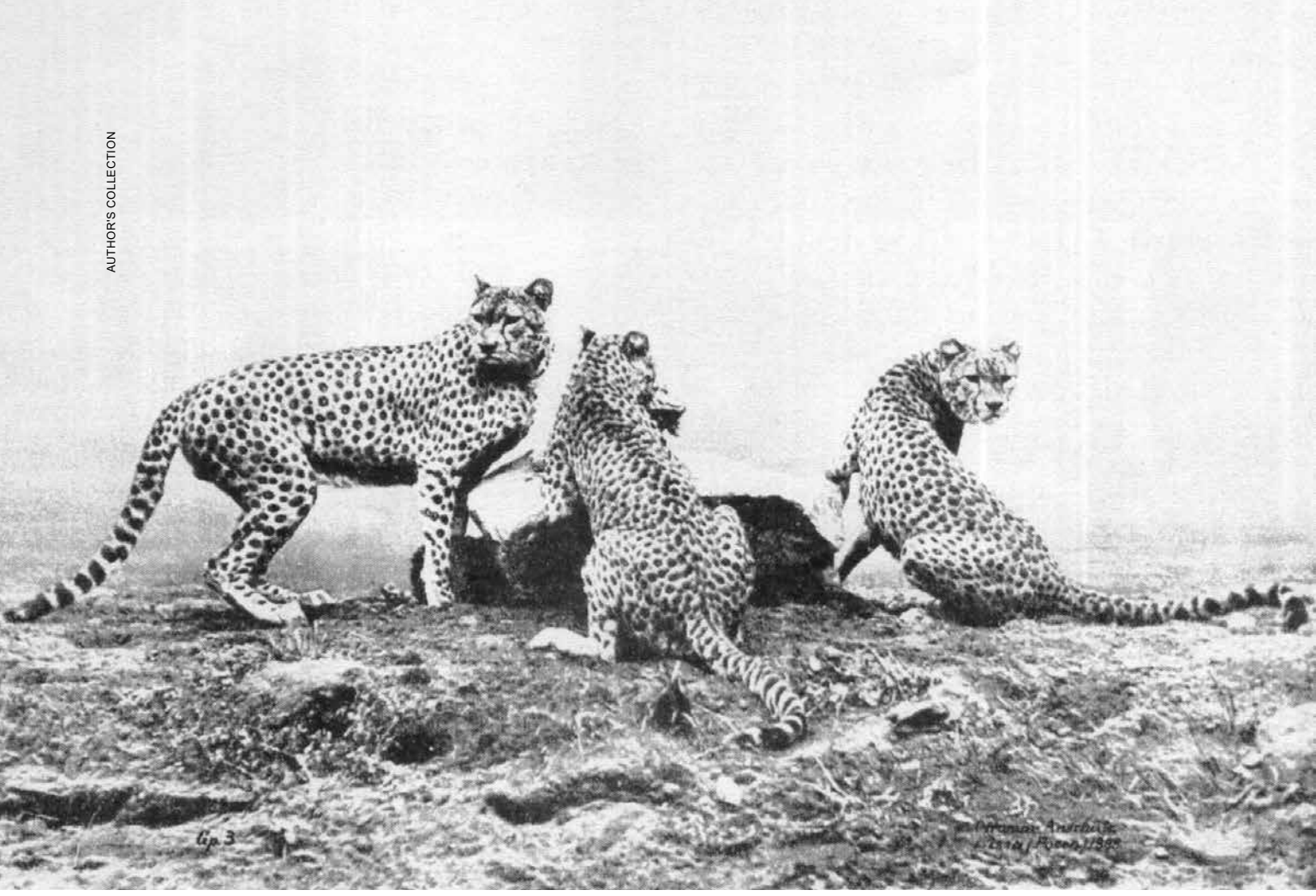
ASIF N. KHAN

Since the December 2023 issue, we have included a page from the diary of a BNHS scientist. BNHS researchers and scientists are known for their hard work, which is rarely acknowledged. Young conservation biologist Manan Singh is currently involved in a Vulture Release Programme in the Vidarbha landscape of Maharashtra. He has been with BNHS since 2020 and previously worked on the Vulture Safe Zone Programme in Madhya Pradesh, Uttar Pradesh, and Haryana. You will get an idea of vulture conservation work from his diary entry on a day in Pench Tiger Reserve.

For the past year, I have been sharing my conservation notes, focusing on urgent conservation concerns. We need to make the scientific community and decision-makers aware of how to create Vulture Safe Zones for wild and captive bred vultures. I am exploring the safety of these zones in India and how to make India safe for Jatayu.

I hope you enjoy reading this issue!

Kishor Rithe



AUTHOR'S COLLECTION

Possibly the earliest photograph of cheetahs in India taken in 1901

Chasing the Cheetah through Indian history

Text: **Divyabhanusinh**

Of the 41 species of cats in the world, the cheetah occupies a unique space between the big cats (lion, tiger, leopard) and the smaller ones. It stands out in two key ways: it is the only cat with semi-retractable claws, which it needs to gain traction on the ground as it sprints after prey. Secondly, it is a daytime hunter, capable of reaching speeds up to 100 km per hour to match or surpass the speed of its prey, such as antelope. The cheetah, along with the caracal, is the only cat that has been tamed and trained by humans to hunt antelope, small mammals, and birds.

Tracing the presence of cheetahs through Indian history requires rummaging through various sources over millennia. Unlike the lion or the elephant, it is not an iconic species,

so references to it are scarce in earlier periods. However, it gained some prominence when records of its use for coursing antelope became available.

The cheetah evolved in Southern Africa and radiated out to Asia, similar to the migration patterns of the lion, ratel, or leopard in ancient times. It is believed to have experienced a population bottleneck between 10 and 12 thousand years ago, making it one of the least genetically diverse cats.

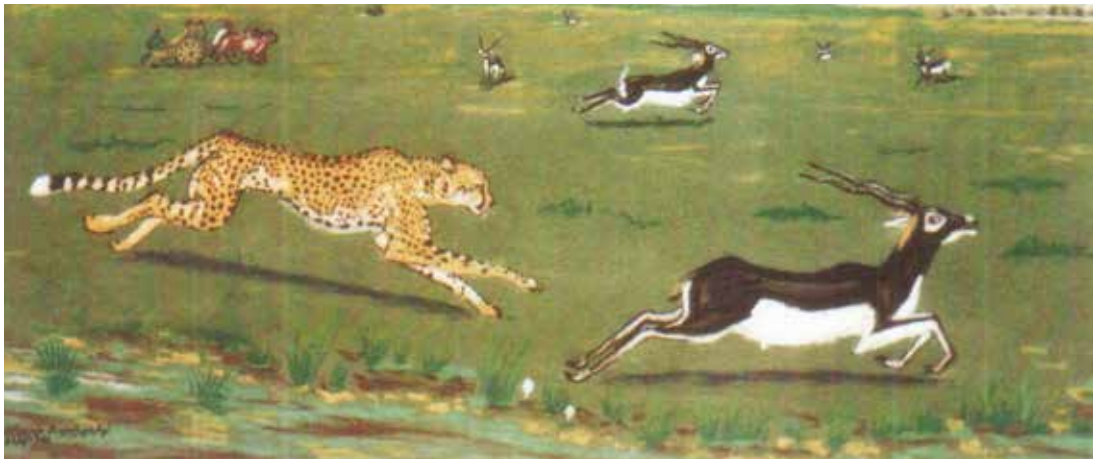
In India, the earliest record of the cheetah is found in a cave shelter in Kharvai near Bhopal. The depiction shows a distinct small head, drooping withers, thin legs, a long tail, and a body covered in distinct spots. This artwork is about 2,500 years old. Other representations from the same period, notably from Karad near Bhopal and Chattarbhujnath near the upper Chambal river in Madhya Pradesh, also exist. A comparison of these cave paintings with those of the leopards from Baghbari in Madhya Pradesh reveals distinct differences. The leopard is depicted with a large head, strong legs, and non-uniform spots resembling rosettes.

Mohenjodaro artifacts, primarily its seals, depict clear representations of tigers, elephants, rhinos, and gharials. However, there is only one seal of a spotted animal that comes close to resembling a cheetah, but it is likely a composite animal. To find further representations of cheetahs, we must look elsewhere.

The 'invasion' of India by Alexander in 326 BCE brought several Greeks and others from Europe to India in his entourage in the army and later, ambassadors to Magadha from his satraps. These individuals left detailed records of what they observed in India, which were then used by chroniclers and geographers in the ancient world. One such was Strabo, a geographer contemporary to Emperor Augustus, describes a royal procession in India that includes, among other animals and birds, *leones* (=lions) and *pardalis*. While the Greek word is generally translated as leopards, it is referring to cheetahs, as it would be most unlikely that the fretful and unpredictable leopards walked among noisy crowds. Classical Greek and Latin literature often confuses cheetahs and leopards, but their behaviours, such as walking in processions, can help differentiate them.

Another record from this period is found in the work of Claudius Aelianus in the 2nd century CE, during the reign of Emperor Hadrian. Aelianus extensively wrote on the "Peculiarities of Animals" in Latin. He mentions that Indians bring to their king four-horned oryxes and *pantheras*, a term in Latin that could refer to both cheetahs and leopards; the oryxes are obviously the four-horned antelopes. In this case it is surely the cheetah. Once again leopards would hardly be safe enough, to be brought to a royal court full of people and hustle and bustle.

In Sanskrit literature, a prominent mention is found in Amarsimha's *Amarkosha*, dated between the 4th and 6th centuries CE, which describes *panchanakha* animals, or five-clawed animals. These include *simha* (lion), *vyaghra* (tiger), *dvipin* (leopard), and *chitraka* (the dappled one or the cheetah). However, the most defining reference comes from the *Manasollasa*, a compilation of activities at the royal court of King Someshwara III of Kalyani, who ruled in the 12th century CE. This lexicon describes hunting with trained hounds, falconry, fishing, and 30 different types of deer hunts. One of these hunts,

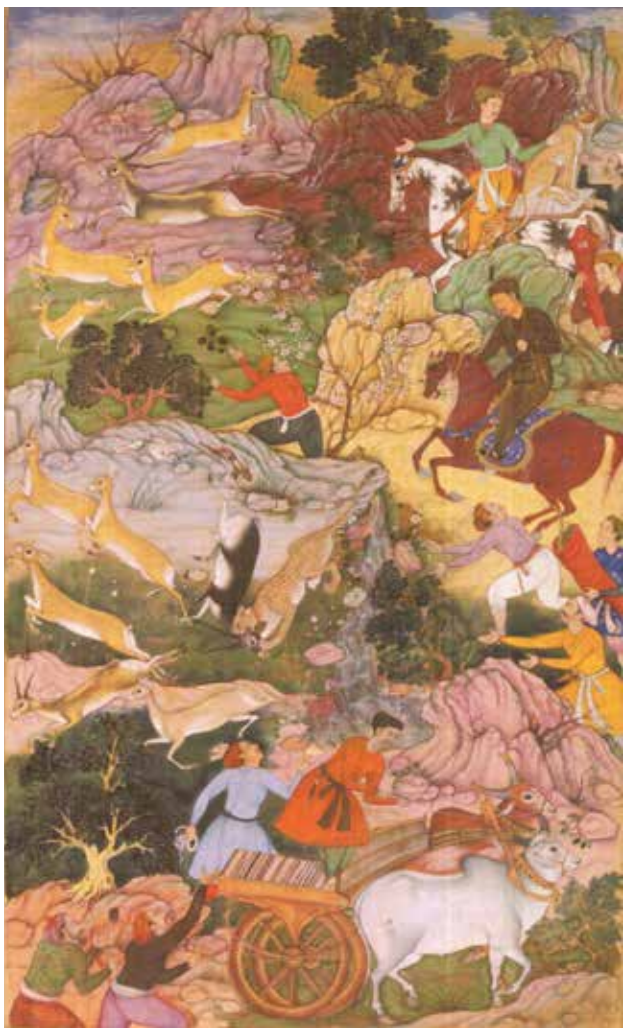


M.K. DHARMAKUMARSINH, 1950, CRAYON ARTWORK

Cheetah chasing its traditional prey, the blackbuck

Vyagraja, details how cheetahs (*chitraka*) were trained to hunt *krishnasara*, or blackbuck.

In Persian and Arabic sources, there are more frequent references to cheetahs, as they were extensively used for coursing antelope. The Persian word for cheetah is *Yuz* or *Yuzpalang*, while the leopard is always referred to as *palang*. A prominent reference comes from the *Tarikh-i-Firoz Shahi* of Shams Siraj Afif, a record of Delhi Sultanate King Firozeshah Tughlaq, who ruled from 1351 to 1388 CE. It mentions that the king's menagerie housed, among other animals, *shir* (lion), *yuzpalang* (cheetah), and *siaghosh* (caracal). The record also notes that when the king went hunting on horseback, he used birds of prey for hawking and cheetahs or caracals for hunting.



COURTESY VICTORIA AND ALBERT MUSEUM, LONDON

"Akbar hunts with a trained cheetah", Lal and Sanwala, Mughal, 1572. This painting illustrates the incident of *Citr Najan* succesfully hunting a blackbuck by jumping across a stream near Sanganer in 1572. In appreciation of this amazing feat the animal was given a jewel-studded collar and a drum was beaten in front of it

The 16th century saw the establishment of the Mughal Empire, reaching its peak during Emperor Akbar's rule (1556–1605), which lasted almost until the end of Aurangzeb's rule in 1707. The Mughals meticulously recorded their activities including the organization of the empire, life at court, and hunting expeditions, where the cheetah played a crucial role as a favourite hunting tool of the emperors.

Emperor Akbar, in particular, is said to have collected 9,000 cheetahs during his half-century rule. At one point, he had 1,000 of them in his menagerie. There was an elaborate categorization of cheetahs at his court, with the highest rank being the *Khasa*, special cheetahs that were Akbar's favourites and were named and given palanquins to ride in. In 1572, Akbar went hunting with one of his favourite cheetahs, *Citr Najan*, at Sanganer, the present-day site of the Jaipur airport. During the hunt, the cheetah chased a blackbuck and jumped over a 25-yard-wide nala, a feat unexpected of cheetahs, as they are sprinters, not jumpers. But, it jumped nonetheless and brought down the antelope. Akbar was so impressed that he presented the cheetah with a precious stone-studded collar, raised its rank to that of a nobleman, and ordered that a drum be beaten in front of it each time it took to the field.

Equally detailed records are found in the *Tuzuk-i-Jehangiri*, the autobiography of Jahangir's 23-year reign from 1605 to 1627, which he wrote in his own hand for most of this period. A keen observer of nature, his autobiography is replete with observations of the fauna and flora he encountered. Cheetahs also drew his attention, and he recorded several instances in minute detail.

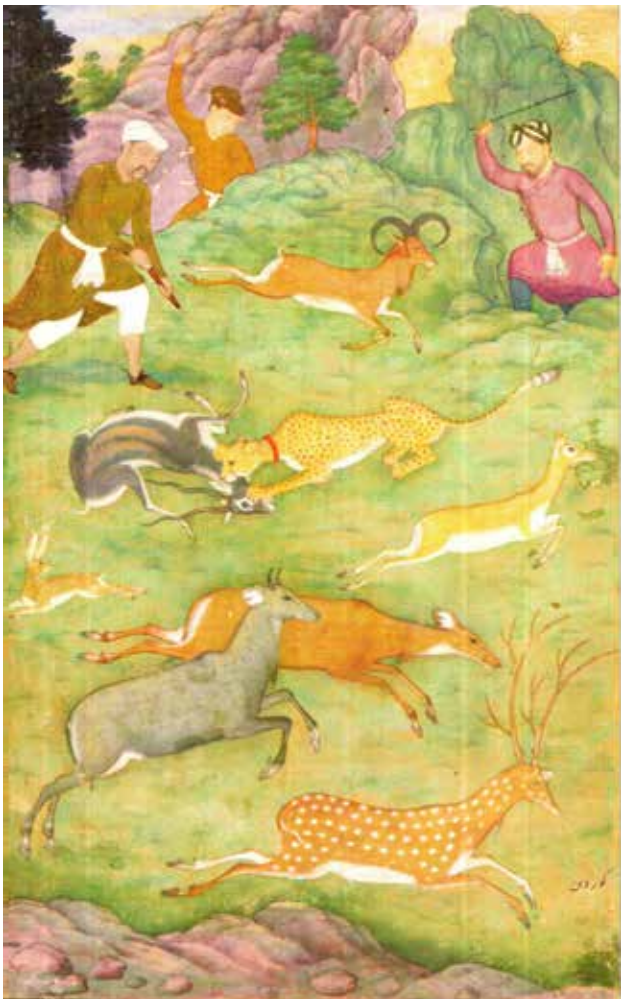
In 1608, one of his favourite courtiers, Raja Bir Singh Deo Bundela of Orcha, brought a white cheetah (*Yuz-i-safed*) to show him. Jahangir notes "The spots of the animal which are (usually) black were of a blue colour and the whiteness of the body was inclined to the same colour." Astonished, he writes that he had never seen a white cheetah. He was so surprised that he goes on to record all the white birds and animals he had seen, including *shaheen*, *basha*, shikra, goshawk, house crow, *kabk* (chukor), grey francolin, *taus* (peacock), as well as white *ahu-i-siyah* (blackbuck) and chinkara. This is the only record of a white cheetah from India, although seven white leopards and several white tigers have been recorded in the Subcontinent.

In 1613, he records that a cheetah at his court slipped its collar and mated with a cheeti. Two and a half months

later, three cubs were born. He notes that during his father Akbar's time, many efforts were made to breed cheetahs, but all had failed. Although the instance he recorded was of tame cheetahs, they mated on their own without any imperial assistance. Yet, Jahangir recognized the event's importance and rarity, stating, "This has been recorded as it appeared strange." It is the only instance of a cheetah breeding in captivity until the middle of the 20th century.

Jahangir's successors, Shah Jahan and Aurangzeb, continued the tradition of hunting with cheetahs, but with the eclipse of the Mughal empire, cheetahs lost their central space and were relegated over time to lesser courts.

During the Mughal period, cheetahs were captured from their habitats in Pattan, Bhatnair, Bhatinda, and Hissar in Punjab/Haryana; Jodhpur, Nagaur, Merta, Jhunjhunu, Amarsar, and Dholpur in Rajasthan; Jamnagar and Siddhpur in Gujarat and Alapur near Gwalior in Madhya Pradesh. An elaborate organization of cheetah catchers was created in the *subas* (provinces) of the empire to supply the imperial court (Agra, Delhi/Shahjahanabad, Ajmer, Lahore, or wherever the emperor's camp was) with cheetahs. According to the Mughals, cheetahs from the Deccan were small, those from the mountains (Afghanistan) were unsuitable for coursing blackbuck (presumably because they did not run down their prey over distances), and the cheetahs from Gujarat and Rajasthan were the biggest and best for coursing. During their reign, an elaborate method of trapping and training them evolved.



COURTESY THE CLEVELAND MUSEUM OF ART

"Antelope and deer hunt", Govardhan, Mughal, 1607–10 CE. The cheetah has caught a blackbuck as a hunter pulls out a knife to perform halal. The other animals depicted here were also preyed upon by the cheetah in India

However, for millennia, cheetahs were removed from the wild, and during Mughal rule, they suffered removal and captivity in even larger numbers, which took its toll on their existence. By the time the British arrived on the scene, the cheetah was already on its way out, as we shall see.

With the collapse and disintegration of the Mughal empire, competing regional and foreign powers became strong, including the British. With the Battle of Plassey in 1757, their ascendancy was assured, and they soon adopted the lifestyle of rich Indians, including shikar. The first book on the subject was published 50 years later in 1807, titled ORIENTAL FIELD SPORTS by Capt. Thomas Williamson. Over a thousand books were written on the subject up to 1947 and beyond, several of which had references, sometimes more than passing, to the cheetah. However, no full-length book was written on cheetahs, and I came across only one book, THE RIFLE IN INDIA by L.L. Fenton, which had a full chapter on the cheetah.

The picture we get from the British period records is that the range of the cheetah in the Indian subcontinent was extensive, from Punjab in the North to extreme south beyond Thanjavur, and from Balochistan in the west to Murshidabad in Bengal in the east. They shared different niches in various landscapes with other large predators such as lions, tigers, and leopards, as the animal inhabited the grasslands and scrub jungles. The British hunted with the cheetah and gave it the English name "Hunting Leopard", but generally, they did not take to the sport, considering it vicarious, as it was the animal that did the hunting. However, until the arrival of the British, the cheetah was not usually an object of shikar for emperors, kings, and lesser potentates, as it was required for the

sport of coursing blackbuck. However, they added a new dimension to the animal's woes, hunting it as a trophy and even considering it vermin for which bounties were paid. The main objects of British shikar were megafauna such as lions, tigers, leopards, elephants, and rhinos. Cheetah shikar was peripheral, and often, it was accidental.

Actually, the cheetah was well on its way to extinction by the time the British arrived on the scene. A detailed study of the records of cheetahs in the Indian subcontinent by the author and Raza Kazmi arrived at a figure of fewer than 431 between 1772 and 1997. The last record was from Balochistan, and it is possible that these animals could have strayed from Iran.

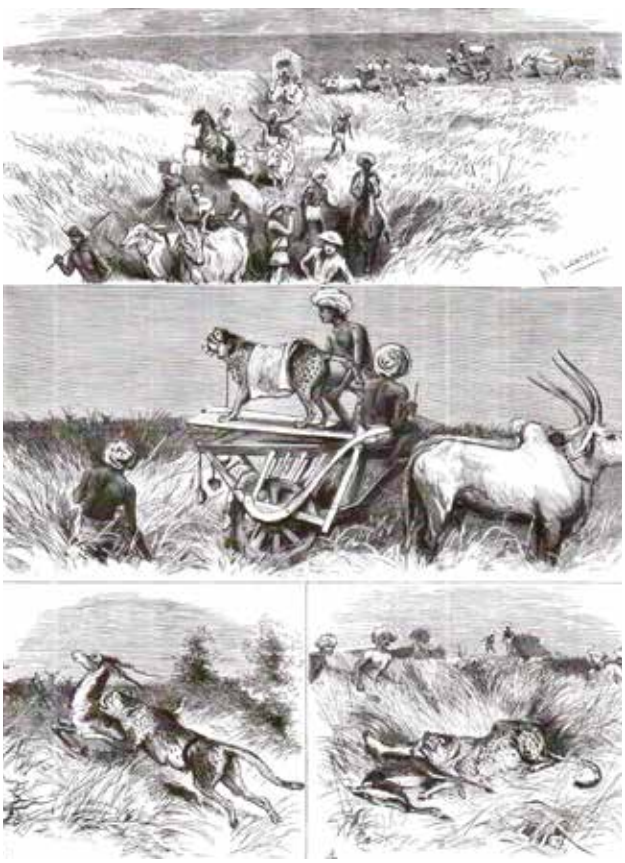
By the time India and Pakistan became independent, the story was all but over. Three cheetahs were shot in 1947 in Korea in Jharkhand, and credible sighting records were reported in 1967 from Korea and in 1975 from Hazaribagh, Jharkhand. From Pakistan, cheetahs were shot or sighted in Balochistan until much later, as noted above.

Before we come to the final chapter of the saga of the cheetah in India, let us look at the sport of coursing blackbuck in India. Since the animal was used for this sport, many detailed records from the past are available. *Baznamas*, treatises on falconry of the Mughal and earlier periods usually had a chapter on taming, training, etc. of the animal. This was because of the extant convention or belief that coursing with them was akin to falconry, and therefore the animal should be classed with the birds of prey. Actually, there was a saying among the trainers of the time that cheetahs fly while a *shaheen* walks when they hunt! As the sport continued in lesser royal courts, detailed records on the subject appeared from there such as from Thanjavur, Ajaigarh in M.P., Kolhapur, and Baroda.

It is important to note that as the animals had become very rare in India in the 20th century. As a result Indian princes and others started importing cheetahs after the First World War, primarily from Kenya and Tanzania. These animals arrived after a choppy journey across the Arabian Sea without tranquilizers and antibiotics. Yet, they seem to have withstood the ordeal well in most cases, as no records of mishaps exist, and they were treated in exactly the same manner as the Indian animals were by their keepers. If they fell ill, they received the same traditional Indian medication, which had evolved over millennia and was given to the Indian animals. They were trained, tamed, and hunted in the same manner as Indian animals over millennia, a fact noted in the *Chityasambandhi Samanya Mahiti*, the Baroda treatise on the subject written by Major R.S. Parab in 1925 for the Baroda State. My own inquiries with R.S. Dharmakumarsinhji of Bhavnagar, who had hunted with cheetahs, and others in Jaipur and Kolhapur, confirmed this fact.

It is not known how many cheetahs were imported between 1918 and 1947. My estimate is that the number would be 200 or fewer. It appears the last imported cheetah survived until around 1960 in Kolhapur.

Cheetahs from the wild were caught in India by trapping them in deer gut nooses spread around a marking tree. Once caught, a net would be thrown over it to immobilize it, and then its eyes would be covered with a specially designed cap called a *topi*. It would then be secured on a *charpoy* and carried to the cheetah keeper's home to live with his family, where the animal would get used to human voices. Its eyes would be covered initially except at feeding times. Once the animal became tame enough, it would be released after a disabled antelope to get it back into its sprinting fettle. At feeding time, food would be given from a long-handled ladle called a *hakna*. A person covered in black would be



H.B. LAWRENCE, DRAWINGS, 1882

Hunting blackbuck with the cheetah in Baroda

made to stand in front of the animal at all feeding times. Thus, the animal would start associating the black colour with food and then it would only kill a black male antelope from a herd while hunting.

The period of training varied from animal to animal and could take from three to six months. Once fully trained, the cheetah would be taken in a bullock cart or a car near a herd of blackbuck and then it would be unhooded and released. It would stalk, get within sprinting distance, and then with a monumental burst of speed, it would bring down the animal, catching it by the throat. It would be offered food from a *hakna* to release its grip on the throat, whereupon halal would end the antelope's life, making its food permissible for the Muslim handlers. As compensation, one rear leg of the hunted animal would be given to the hunter.

Usually, a cheetah was made to hunt only once in a shikar outing, but there were many good animals that could hunt several times in a day. Not all hunt attempts were successful, as is the case in the wild. Even on days when a cheetah was not taken out to hunt, it would be made to run after a lure to keep it fit.

Along with falconry, hunting with cheetahs was a much-prized activity at royal courts and among rich jagirdars or zamindars. However, it was an expensive pastime and it died in India with the integration and merger of Indian states into the Dominion of India between 1947 and 1950, as it had disappeared elsewhere in Asia and Europe centuries earlier. Today, most people are not aware of the sport and are surprised to know it ever existed.

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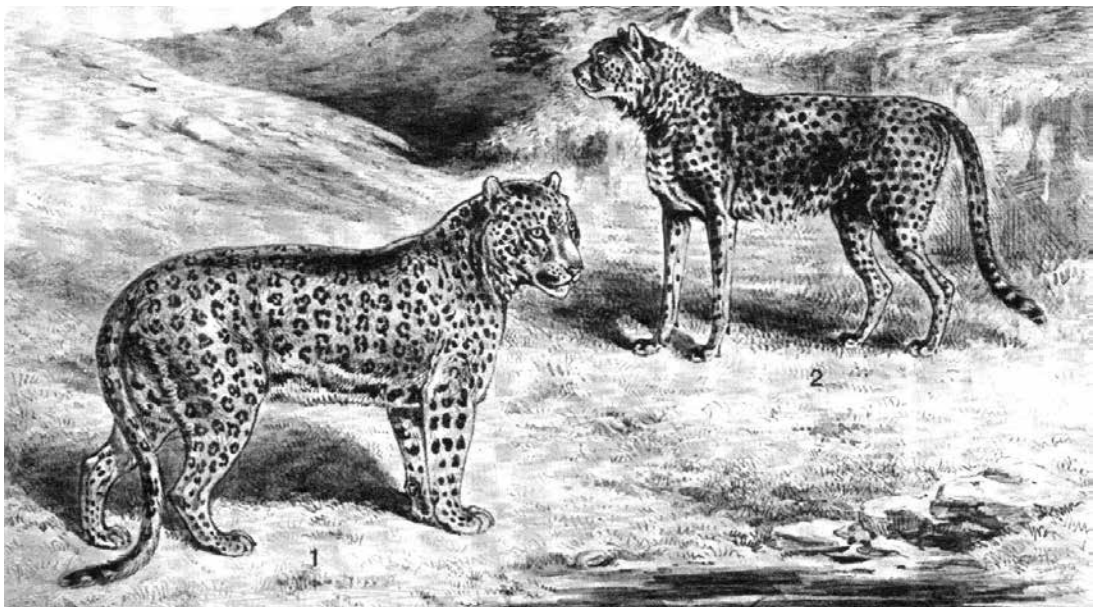
"A cheetah ready for the hunt", watercolour, made for Marquis Wellesley, 1800 CE. The animal wears a blindfold and cloak, with the wooden spoon beside it

There were several reasons for the cheetah becoming extinct in India. For centuries, this animal was removed from its wild habitat for the purpose of hunting. Large numbers were taken out for centuries, especially during Mughal rule, so much so that a separate bureaucracy was created to keep the imperial court supplied. Since the animal



A.J. ELWES, PAINTING, 1877

An illustration of panther and cheetah reproduced from "Thirteen years among the Wild Beasts of India: Their haunts and habits from personal observation; with an account of the modes of capturing and taming elephants" by G.P. Sanderson (1878)

did not breed in captivity until recent times, it could not be bred or domesticated like cows, buffaloes, horses, or dogs. Additionally, its hunting required a fast run; therefore, it preferred grasslands and scrub jungles. These areas came under the plough first as a result of human and livestock population increases, particularly in the late 18th and 19th centuries. India was also the extreme part of the cheetah's range with a narrow prey base compared to Africa, with primarily blackbuck and chinkara, supplemented by fawns or young of nilgai, cheetal, and small animals like hares. The cheetah's prey inhabited landscapes that were heavily impacted by human intervention before forests met the same fate, leaving only a few mostly in the protected areas. Finally, the few cheetahs that survived became objects of trophy hunting.

The cheetah's plight came to the attention of the young Republic of India very early on. In 1952, the Indian Board for Wildlife called for assigning special priority for the protection of the cheetah in Central India. In 1955, its members discussed a bold experiment to preserve the animal. A couple of studies were conducted for a reintroduction programme, and in the early 1970s, M.K. Ranjitsinh initiated a programme to obtain cheetahs from Iran in exchange for Asiatic lions. This too came to naught with the declaration of emergency by Prime Minister Indira Gandhi in 1975 and, the subsequent loss of Reza Shah Pahlavi II's throne in 1979. The matter remained dormant until 2009 when M.K. Ranjitsinh, a member of the National Board for Wildlife and its Standing Committee at the time, raised the issue with the then Minister of Environment, Forest and Climate Change, Jairam Ramesh. I had given a copy of my first cheetah book to the Minister who read it and was convinced of the cheetah's place in India's past. The matter was discussed in the National Board for Wildlife's meeting chaired by Prime Minister Manmohan Singh and a go-ahead was given to the proposal of reintroducing the animal.

At this juncture, matters took a curious turn. The Supreme Court was hearing a case for the Asiatic lion's proposed second home at Kuno Palpur in Madhya Pradesh by transferring some animals from the Gir Forest in Gujarat since 1995. In 2013, the court ordered that a second home for the lions must be created there. Due to misleading representations to the court, the two-judge bench also ruled that the government's plans to reintroduce cheetahs were arbitrary and illegal, stating that "introducing African cheetahs into Kuno cannot stand in the eye of the law and the same is quashed."

In reality, the delay or non-transfer of Asiatic lions to Kuno Palpur was not related to the cheetah project. The state government of Gujarat had opposed the second home for the lion from the 1990s onwards, just as Nawab Rasulkhanji of Junagadh had refused to give lions to Gwalior State as early as in 1900 for reintroduction in the same landscape.

The National Tiger Conservation Authority took up the matter again in the Supreme Court. There was much opposition to the project in and out of the court. It was falsely stated that Iran had refused India's request for cheetahs, whereas no such request had been made. It was also claimed that introducing cheetahs from Africa violated IUCN guidelines for reintroducing locally extinct species. However, this was not the case, as the guidelines allowed introduction of a different subspecies if the original subspecies was not available for reintroduction subject to conditions such as ensuring no harm came to the donor population. The programme was also opposed because it did not form part of the National Wildlife Action Plan of 2002–2016 and 2017–2029. In fact, the draft Action Plan of 2017–29 included the specific programme at my instance as a member of the expert committee drafting it, but it was removed from the final plan document as the matter was sub judice at the time.

The three judge bench of the Supreme Court headed by Chief Justice S.A. Bobde, examined these and other objections and asked M.K. Ranjitsinh to present the case for the programme. After hearing him the court approved the programme and gave the go ahead in their order of 2020.

As a result of this clearance, the programme proceeded further and on September 17, 2022 Prime Minister Narendra Modi released the first cheetahs in Kuno Palpur, which had arrived by a special charter aircraft from Namibia, unlike the daunting travel conditions of earlier imports. One of the objective of bringing cheetahs back into India was to restore the only mammal that became extinct after Independence. Also, its first home in Kuno Palpur is a small starting point for the species to be introduced elsewhere in its former range by restoring grasslands, which have received little attention from our forest-centric protection efforts. This was the second reason. Critics often ask why bring cheetahs when there

PHOTOGRAPH COURTESY: SHIVANG MEHTA, WILDLIFE INSTITUTE OF INDIA/ NATIONAL TIGER CONSERVATION AUTHORITY, CHEETAH PROJECT

Kuno-Palpur National Park, Madhya Pradesh, September 17, 2022.
Prime Minister Narendra Modi releases the first two cheetahs from Namibia

are other pressing conservation issues The answer is clear: we need to restore lost habitats of the animal which would also protect other animals such as caracal, hyena, wolves, and desert and jungle cats. If the same objections were applied to other activities of our country, one could ask why go to the moon or circle the sun when we have other problems to sort out?

The Asiatic lion has protected the Gir forest, the tiger and the elephant have protected huge swathes of jungles in so many of our protected areas and the rhino has protected Kaziranga and other landscapes in Assam and West Bengal. I ask: were it not for these animals, would their habitats have survived? They are the symbols that protect their landscapes. Similarly, cheetah, the apex predator of grasslands would become a symbol of these neglected landscapes that need protection and restoration.

The programme has had many challenges, but it is hoped that the cheetahs of Kuno Palpur soon move out of their enclosure as originally envisaged and roam freely. Regrettably, not much detailed information is in the public domain to make a critical assessment of the developments so far. One hopes for the best.

In 1952 rhinos were believed to be practically extinct in Assam according to the then Chief Minister of the State, M.R. Medhi who informed Prime Minister Jawaharlal Nehru. Seventy years later there are 2,400 of them in Kaziranga alone. In 1972–73 there were some 1,800 tigers. Today we have around 4,000 of them 50 years later. Protection of lions was initiated in Junagadh State as early as in 1879 by Nawab Mahabatkhanji II, and his successors Nawab Rasulkhanji and Nawab Mahabatkhanji III continued the policy. The state and central governments continued this after independence. At one stage lions were believed to be near extinction. Today there are some 700 of them. It has taken a century and a half to get here.

A small first step has been taken in the Cheetah project. The journey is long and will have pitfalls as there have been in the past. It would be premature to claim success or failure so soon after the cheetahs' arrival in India. It is surely time to restore the only animal that became extinct after our independence.

Divyabhanusinh, past President of WWF and Vice President of BNHS, served on the National Board for Wildlife and its Standing Committee (2008–2013), and was a member of the expert committee that drafted India's National Wildlife Action Plan (2017–2031). A member of the Cheetah Task Force of the GoI, his research on Asia's cheetahs and lions is highly acclaimed.

Why Cheetahs were reintroduced to India and what lies ahead

Text: **Yadvendradev V. Jhala**

The human-caused sixth mass extinction crisis can only be addressed by humans themselves. One crucial remedial tool is the restoration of lost elements of ecosystems through reintroductions. Apex carnivores play a pivotal role, exerting a top-down cascading effect on lower trophic levels that enhances diversity and stability in ecosystems. Viable populations of apex carnivores can only thrive within intact ecosystems, making their restoration pivotal for biodiversity conservation. Large carnivores also captivate human interest, serving as flagships to mobilize resources, public opinion, and political will for biodiversity conservation. The reintroduction of the cheetah to India aligns with this purpose.

Despite sincere efforts, Indian conservationists have struggled to elevate species like the great Indian bustard, the ancient Indian wolf, and the caracal to flagship status for directing conservation policy for scrub-grassland-dry forest ecosystems – one of the most over utilized and threatened biomes in our country and often classified as "wastelands". In contrast, the tiger and lion, as top predators, have captured the imagination of

A coalition of two male cheetahs attempting to mate with a female in estrous in Kuno National Park

YADVENDRADEV V. JHALA

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A Namibian male cheetah in the grasslands of Kuno National Park

legislators and bureaucrats, leading to some resources being allocated for their conservation. The cheetah, having attracted attention at the highest levels in India, holds the promise of translating this attention into resource allocation for restoring neglected ecosystems crucial for biodiversity conservation and the agro-pastoral economy.

The cheetah holds a significant place in India's natural and cultural heritage, having been a major evolutionary force on the subcontinent. The speed of the blackbuck and chinkara has evolved as an "arms race" against cheetah predation. The cheetah is an Ethiopian biogeographic element, much like the striped hyena, leopard, lion, ratel, and caracal that migrated to India from Persia. With its name of Sanskrit origin, the cheetah is described in ancient texts like the Vedas and Ramayana and has been depicted in ancient cave paintings in central India dating back 10,000 to 30,000 years. Ironically, the cheetah was the only large carnivore made extinct in independent India between the 1950s and 1960s due to human actions. Today, India possesses the scientific knowledge, economic resources, and political will to revive this lost element of its cultural and natural heritage.

After scientific evaluation based on habitat suitability, prey availability, and human impacts, and in accordance with IUCN guidelines for Conservation Translocations, Prime Minister Narendra Modi released the first three cheetahs from a batch of eight brought from Namibia into Kuno National Park on September 17, 2022. Subsequently, 12 more cheetahs were brought from private game reserves in South Africa.

Ideally, the Asiatic cheetah subspecies should have been the source for reintroduction to India. However, the only Asiatic cheetahs, surviving as a relict declining population of 15–20 individuals, are in Iran. These Asiatic cheetahs are on the verge of extinction, highly inbred, and any removal would further endanger their survival, rendering them unavailable and unsuitable for the Indian reintroduction programme. In such cases, the IUCN recommends using the closest genetic or ecological equivalent subspecies or race. The latest full genome sequence study of cheetahs across their historical range suggests that all cheetah subspecies are genetically equidistant from *Acinonyx jubatus venaticus*, the Asiatic cheetah subspecies. Thus, criteria other than genetics take precedence in selecting the source population for Indian reintroduction. For the establishment of any new cheetah population, 30–40 genetically diverse, disease-free individuals capable of hunting and avoiding predators and humans are required. The only population meeting these criteria is from southern Africa, where Namibia, South Africa, and Botswana are home to about 4,000 cheetahs. This population can sustain an offtake of 30–40 individuals without negatively impacting the source population. In fact, the metapopulation of cheetahs maintained within fenced game reserves of South Africa has registered a growth rate of 9% over the past 10 years, with managers

COURTESY: YADVENDRADEV V. JHALA

A cheetah being released from his transportation crate into its quarantine boma after the long flight from Namibia to Kuno on September 17, 2022

SHIVANG MEHTA'S TEAM

Captive reared wild orphaned cheetahs being taught to hunt at the boma facility in Kuno National Park

constantly seeking safe reserves (space) to accommodate this rapidly growing population. Cheetahs in most other parts of their range are declining, with 15 of their range countries experiencing local extinction since the 1940s. The extant range of cheetahs is only 9% of its historical range. Therefore, the reintroduction of cheetahs to India contributes to the global goal of conserving the cheetah as a species by providing safe habitats for its expansion.

To sustain a wide-ranging large carnivore like the cheetah, it is crucial that the site has sufficient prey, habitat, and minimal human disturbance. These requirements ensure that large carnivores serve as umbrella species for biodiversity conservation. The recovery of tigers across India's forested landscapes has resulted in the resurgence of many threatened species, as evidenced by large-scale camera trap surveys conducted by the NTCA-WII-State Forest Departments every four years since 2006. Kuno has received conservation investments for the past 20 years, including village resettlement and anti-poaching activities, preparing it for the reintroduction of Asiatic lions from the Gir Forests of Gujarat. This investment has led to an increase in prey population from 6 per km² in 2002 to over 48 per km² by 2014. Similar investments and recovery efforts were envisioned for other cheetah reintroduction sites like Gandhisagar-Chittorgarh, Nauradehi, Shahgarh-Jaisalmer, and Mukundhara.

Kuno serves as an ideal second home for Asiatic lions, supported by the best conservation science. However, implementing a reintroduction is impossible without government support. Conservation biologists have struggled to convey the importance of this narrative to the Indian government and its people. Kuno needed cheetahs as much as Sariska needed tigers for its survival. Without cheetahs, the national park would have deteriorated beyond recovery. While it's ideal for science to guide conservation, scientists must be adaptable to achieve the greatest conservation success and avoid being lost in dogma, which can be counterproductive.

The introduction of cheetahs to Kuno does not compromise its potential for housing lions and tigers. In fact, having top predators like lions and tigers would help reduce the density of leopards in Kuno, facilitating the establishment of cheetahs.

Kuno's habitat, comprising dry-deciduous open forests, mixed forests, open meadows (formerly agricultural fields), and riverine forests, has been deemed ideal for cheetahs by experts. The prey base includes chital, hare, peafowl, wild pigs, four-horned antelope, chinkara, young sambar and nilgai, and blackbuck in the larger agro-forest mix landscape. The potential for reintroducing blackbuck within Kuno National Park exists in the plateau areas, especially at the recently relocated Bagcha village site.

In the absence of tigers and lions, leopards are the apex predators in Kuno, occurring at a high density (~20 per 100 km²). Conservationists had anticipated about a 50% loss of reintroduced cheetahs to leopards, poachers' snares, road kills, and other human causes. Fourteen cheetahs were released from their predator-proof fenced bomas and together they spent approximately 800 days as free-ranging individuals before being captured and returned to the bomas. During this period, none of the cheetahs died from expected causes of mortality. They successfully hunted prey such as chital, nilgai, four-horned antelope, blackbuck, and hare. Only three of the 14 individuals dispersed far from the protected area and had to be captured and brought back. This bodes well for the project, showing that reintroduced cheetahs can adapt well to Indian conditions and survive as free-ranging wild cheetahs, finding food and water on their own.

However, some cheetahs have died (7 adults and 3 cubs), with many of these deaths resulting from a lag in adapting their biorhythms to the shift from the Southern Hemisphere to the Northern Hemisphere and failure by management to diagnose and treat resulting skin lesions in time. High-profile conservation projects like Project Cheetah, while benefiting from resource allocations, unfortunately suffer from political and bureaucratic meddling where objectives other than those dictated by science and conservation take precedence. Under such circumstances, wildlife managers and scientists are averse to making decisions for fear of damaging their careers, but such decisions are required to achieve the project's objectives.

Currently, only one of the surviving cheetahs is free-ranging, while all others are within the safe confines of predator- and human-proof fencing, stocked with abundant prey. However, a full winter and summer were lost during which time these cheetahs could have established home ranges and communication networks vital for their stabilization. Some cheetahs would likely have wandered into risky human-dominated parts of the landscape, requiring capture and return. Keeping and breeding cheetahs within fences without securing their ecosystems falls short of the overall conservation goal of Project Chetah. There are sufficient fenced game reserves in Africa where cheetahs are proliferating, and ranchers are finding it difficult to find new homes for them.

Within the confines of safe fencing, the reintroduced cheetahs have done quite well. There have been four litters born to three females, with a total of 17 cubs born, of which 14 are currently surviving. Ecotourism has started to pick up in Kuno, with tourists getting to see free-ranging cheetahs on Indian soil. Cubs born in India and adults with some exposure to Indian seasons will likely shift their biorhythms to our climate after acclimatization. This adaptation should stop them from developing a winter coat during the summer heat of India, but certainty will come in a couple of years.

There has been a rush to purchase real estate near Kuno National Park. With the release of the first cheetahs, community landowners have become rich overnight, with some land prices shooting up almost a hundredfold. The Chief Minister of Madhya Pradesh announced that lands of relocated villages from Kuno National Park will be gazetted as revenue villages, providing privileges of political self-governance and free sale. The Union Minister of Environment, Forest and Climate Change, along with senior bureaucrats, visited peripheral villages, educating and sensitizing adults and school children about cheetahs and their ecosystem. A cheetah mascot, "Chintu Cheetah," is used by the Forest Department of Madhya Pradesh to promote cheetah conservation in the landscape.

Due to these efforts, there is significant hype and goodwill for the cheetahs among local communities. There is real potential for economic gain by the local people, provided policies are framed appropriately and in time.

COURTESY: YADVENDRADEV V. JHALA

Radio-collaring and recording measurements on a cheetah in South Africa, a requirement before transportation to India

A landscape eco-tourism plan that promotes eco-sensitive and aesthetic tourism, and safeguards these opportunities for local communities, needs to be implemented. Subsidies for purchase of safari vehicles, promoting home-stays large resorts, and the training and certification of nature guides, are some ways to ensure that livelihoods of locals improve because of the cheetahs. The cheetah is a tourist magnet and as a carnivore it offers unique opportunities that are not possible with other large carnivores. Unlike tigers, lions, and leopards that remain active at night, the cheetah is diurnal. Witnessing a cheetah hunt can be a life changing experience. Revenue from tourists, especially park entry gate receipts needs to be shared with buffer zone communities as is the norm in Madhya Pradesh and in many Tiger Reserves across India. Unfortunately, besides some awareness campaigns, little is being done for local community economic upliftment – a vital investment for long-term goodwill from communities.

The Cheetah Action Plan explicitly outlines the constraints of establishing viable cheetah populations in India. Reintroductions require a long-term commitment of resources, a continuous supply of appropriate animals from the sources, and political will – currently the least restrictive, given that the Prime Minister himself has released the first lot of cheetahs. Securing vast wilderness areas of several thousand square kilometres devoid of humans is not possible in India. Therefore, several smaller populations need to be established and managed as a metapopulation.

The difference between South African wildlife populations and wildlife in India is that in South Africa, wildlife is contained by physical barriers (electric fences) since local communities are intolerant, while in India, physical fences are not required because of community tolerance. Lions, tigers, leopards, and elephants move across human-dominated landscapes through habitat corridors (albeit with some conflict). If conservationists and wildlife managers fail to establish community tolerance towards cheetahs, then establishing free-ranging cheetahs in India would fail. Cheetahs are comparatively easier to coexist with compared to tigers, lions, leopards, and elephants. There is no record of a wild cheetah killing a human. Local communities around Kuno are accustomed to living with leopards and, in the recent past, with tigers.

Cheetahs have large home ranges and are expected to roam out of the protected areas into human-dominated parts of the landscape. Instead of capturing and bringing back these cheetahs into the protected area, local people

YADVENDRADEV V. JHALA

Captive reared cheetah after learning to hunt now kills native Indian prey in Kuno National Park

should be encouraged to see an opportunity here. Cheetah viewing on private/public lands outside of the protected area can be a major source of revenue. If proper checks and balances are established from the beginning to legitimize such an activity within the ambit of the Wild Life (Protection) Act, then the problems associated with locals taking liberties, as has happened with lion shows in Saurashtra, can be prevented. Once local communities experience the huge economic benefits from cheetahs, the loss of an occasional goat or sheep would not be an issue anymore. This approach would ensure that cheetahs flourish in India, beyond the protected areas that would serve as breeding sources and the larger human-dominated landscapes as sink and corridor habitats.

What is required now is to invest in restoring habitat and prey and reduce human/livestock impacts by incentivized voluntary relocation of human settlements from cheetah reintroduction sites. Several villages have been relocated at the second site, Gandhisagar, and the only remaining village, Bagcha, within Kuno National Park has been resettled outside the national park within the past year. It took over 20 years to restore Kuno, but with appropriate allocation of resources, this can be achieved much faster in the Gandhisagar-Chittorgarh landscape, Nauradehi Wildlife Sanctuary, the Banni Grasslands of Kachchh, amongst other sites (Mukundhara Tiger Reserve, Shahgarh in Jaisalmer, etc.). Thus, with the cheetahs adapting well to the Kuno habitat and prey, showing high reproductive potential and likely to adjust to the northern hemisphere seasons within a couple of years, the project seems poised for success.

But the litmus test is only partly done: free-ranging cheetahs outside of the protective fences where they establish home ranges, survive, breed, and successfully recruit cubs is yet to be achieved. Cheetahs brought to India are behaviourally appropriate, predator-savvy, and in their prime age; delaying the release and addressing this crucial stage of the project will reduce the probability of success as the cheetahs are aging in their safe bomas without contributing maximally to the project. The young cubs born in the protective bomas will learn the required hunting skills from their mothers as the bomas are designed appropriately and stocked with high density of native prey. But these cubs need exposure to other carnivores and natural (low) prey densities and may not become predator-savvy – a crucial skill required to survive

DHANANJAYSINH Y. JHALA

Satellite and radio-tracking is a standard tool for monitoring cheetahs in Kuno National Park

with leopards and tigers. In free-ranging conditions, cub survival will be lower, but those that survive will be equipped with skills required to establish the species in India. Only free-ranging cheetahs can serve as umbrella species to restore ecosystems – the primary objective of cheetah reintroduction. Fenced safari parks and breeding centres alone fall short of achieving this goal.

The cheetah reintroduction in India is being carefully watched by the global community, and its outcome will decide the fate of many other reintroductions across the world. The stakes of the cheetah reintroduction are therefore not limited to India. All effort and resources should be invested based on the best conservation science to ensure the project's success.

Yadvendradev V. Jhala was the Principal Scientist on the Cheetah Project (2009–2023) and retired as Dean of the Wildlife Institute of India, he is currently a Senior Scientist of INSA

CLEMENT FRANCIS

African Cheetah *Acinonyx jubatus jubatus*

ABOUT THE POSTER

CLEMENT FRANCIS

African Cheetah *Acinonyx jubatus jubatus*

Cheetahs are the fastest land animals, capable of reaching speeds up to 97–113 km/hr in short bursts covering distances up to 500 m. Their slender, lightweight bodies are built for speed. They have long legs, a flexible spine, large nasal passages for increased oxygen intake, and a large heart and lungs to support their high-speed chases. They can accelerate from 0 to 60 mph in just a few seconds. This incredible speed is used to hunt small to medium-sized ungulates, which are their primary prey. Cheetahs, being more solitary and less aggressive, are at a disadvantage in direct encounters. Unlike other big cats, cheetahs primarily rely on speed and agility rather than stealth to catch prey. They usually hunt during the day to avoid competition with larger predators and use their keen eyesight to spot prey from a distance.

The cheetah is listed as vulnerable by the International Union for Conservation of Nature (IUCN). Habitat loss, human-wildlife conflict, and declining prey populations are major threats. The Convention on International Trade in Endangered Species (CITES) lists them as an Appendix 1 species. Most wild cheetahs exist in fragmented populations in pockets of Africa, which is a mere nine percent of their historic range. There are efforts in place to conserve their populations through protected areas and breeding programs, as the cheetah plays a crucial role in its ecosystem by controlling prey populations, thereby maintaining a balanced food chain. ■

Dr G.V. Reddy

October 8, 1960 to July 14, 2024

I was saddened to hear about the passing of Dr Godilla Vishwanatha Reddy, the former Chief Wildlife Warden (CWLW) and Head of the Forest Force (HoFF), of Rajasthan, on July 14, 2024. Dr G.V. Reddy was renowned for his exceptional knowledge of wildlife and ecosystems. In 2017, the office of the Deputy Conservator of Forest (DyCF), Ajmer, sought assistance from the BNHS to conduct a status assessment of the Lesser Florican, following Dr Reddy's suggestion and the directive of the National Green Tribunal (NGT). He played a crucial role in finalizing a tripartite agreement between the Rajasthan Government, the Wildlife Institute of India (WII), and MoEF&CC to establish a conservation breeding centre for the great Indian bustard (GIB) and the lesser florican, underscoring his commitment to preserving endangered species and their habitats.

In February 2019, Dr G.V. Reddy invited BirdLife International, BNHS, and WCS-India to discuss in-situ conservation issues for the critically endangered GIB. I had the privilege of meeting him to discuss BNHS's Bustard and Florican Programme. He was pleased with BNHS's decision to deploy a Senior Scientist in response to his invitation.

In 2019, Dr G.V. Reddy became Chairman of the Rajasthan State Biodiversity Board (RSBB), where he furthered his visionary work in conservation outside protected areas. During his visit to Ajmer on September 7, 2019, he invited me to join him in the field to search for the lesser florican. We discussed conservation strategies for the bird in non-protected areas of eastern Rajasthan, showcasing his proactive leadership. Dr Reddy's vision led to the establishment of the first Conservation Reserve for the lesser florican in Rajasthan, a significant milestone in expanding conservation areas. He was keen on removing the exotic invasive *Prosopis juliflora* as part of long-term habitat restoration to protect the lesser florican. Upon returning to Jaipur, he sanctioned a project to organize a farmer's meeting called "Kisan Choupal". He suggested creating a Hindi booklet on the lesser florican, locally known as "kharmor", and provided his expertise in editing and designing the booklet. I consider it a privilege to co-author the publication "जन सहयोग से खरमोर संरक्षण" with him.

Additionally, he advised Team BNHS to visit Tal Chhapar Wildlife Sanctuary to explore successful blackbuck conservation efforts. He planned to create a satellite sanctuary to translocate some blackbuck to address overpopulation in Tal Chhapar. In 2020, a devastating incident occurred at Sambhar Lake, resulting in the death of thousands of migratory birds due to botulism. Following directives from the Chief Wildlife Warden, I led the BNHS team to Sambhar Lake to gather crucial first-hand information. Dr Reddy acknowledged BNHS's presence at the bird mortality event by honouring the individuals and organizations involved with a national emblem. Even in retirement, he actively guided and supported conservation efforts in non-protected areas, particularly for the GIB and the lesser florican, demonstrating his enduring commitment to wildlife conservation.

The passing of Dr Reddy is a profound loss. His vision for ongoing wildlife conservation efforts, always guided by science-based actions and a willingness to listen to all sides, leaves a significant void. We have lost a visionary officer whose unwavering dedication to wildlife conservation will be deeply felt in the field. ■

– Sujit Narwade, Dy Director
Bombay Natural History Society

Dr A.J.T. Johnsingh

October 14, 1945 to June 7, 2024

Dr Asir Jawahar Thomas Johnsingh, a jungle warrior and exemplary field biologist of the Indian subcontinent, dedicated over four decades to preserving India's wild fauna and flora, from the Western Ghats to the Himalaya. His passing leaves behind cherished memories and an enduring legacy. Wildlife conservationists across the country mourn his loss, remembering their profound associations with him, and I am no exception.

I spent 12,000 hours studying elephants for my Ph.D. and three decades as a field expert, navigating the highs and lows of elephant country, guided by the legendary wildlife biologist A.J.T. Johnsingh (AJT), whom I proudly call my teacher. My field expeditions with AJT in the Southern Western Ghats, from 1983 to 1989, were unforgettable. Alongside Ajay Desai, we conducted elephant research supported by the US Fish and Wildlife Service under the leadership of Mr J.C. Daniel, a celebrated figure in wildlife conservation. Dr V. Krishnamurthy, a renowned elephant expert, also advised us after retiring from the Tamil Nadu Forest Department.

I was a small-town boy from coastal Mayiladuthurai seeking a job to support my family after earning an MSc in Wildlife Biology from AVC College. After learning about BNHS's need for biologists through friends, I reluctantly attended an interview despite scoring poorly on their test. To my surprise, I was offered a position as a junior field biologist, working under Dr AJT upon his return from post-doctoral studies in Virginia, US. I met AJT at his home in Palayamkottai, Tirunelveli District, with Ajay.

Our work included arduous treks through the Kalakad Mundanthurai Mountains, where AJT's leadership and endurance were evident as we studied biodiversity and elephant distribution. One memorable incident involved losing my way, along with Dr Ajith Kumar (the primatologist), while surveying Nilgiri Tahr in Perukundru, the highest mountain in Anamalai Tiger Reserve. We spent a harrowing night on a cliff before being rescued by Varagaliyar Elephant Camp mahouts. AJT and other crew members who had returned to the base camp did not sleep that night, worried about our survival in the cold December climate of Anamalai. After this tough survey, I decided to leave; it was AJT's encouragement that brought me back.

On another occasion, AJT, our tracker Sankaran, and I faced a thunderstorm in dense forests of Kalakad-Mundanthurai Tiger Reserve, near Kalivarpulmottai, soaked and besieged by leeches. Though daunting, such experiences prepared me for later fieldwork in Mudumalai's deciduous forests, where I traced elephant herds with ease.

AJT's expertise was instrumental during operations relocating herds in Anamalai, ensuring team safety amid tusker encounters. His guidance taught me invaluable lessons, such as distinguishing sounds in the jungle. For instance, an elephant herd walking on dry leaves sounds like rustling Palmyra leaves. This knowledge proved vital when managing problematic herds in Dindigul Forest Division.

AJT's rigorous training regimen, beginning at dawn with long treks and minimal food, underscored his commitment to fieldwork. His knowledge of flora and fauna was vast, transforming me into an expert on grass and tree species favoured by elephants, while Ajay focused on avifauna.

AJT's advice, like wearing only slippers for quick tree climbing during elephant encounters, became invaluable strategies in our work. His dedication and knowledge continue to inspire my career, and reflect his profound influence on elephant conservation efforts nationwide.

AJT's guidance enabled me to complete my Ph.D., the first doctoral degree on elephants from Tamil Nadu. Following this, I undertook numerous national and international elephant projects funded by the Tamil Nadu State Forest Department and the Government of India. With lessons inherited from AJT, I completed fifty projects on elephants and other endangered species, integrating his teachings into studies on elephant ecology, behaviour, spatial distribution, movement patterns, corridors, human-elephant conflict, and other projects on species like gaur, sloth bear, olive ridley turtle, and community eco-development. I dedicate these wildlife projects to AJT.

Dr AJT, an exceptionally talented wildlife scientist and conservation naturalist, hailed from Nanguneri, Thirunelveli District. He developed his passion for wildlife through early jungle exposures with his army-retired brother. After his zoology master's from Madras Christian College, AJT briefly lectured at Ayya Nadar Janaki Ammal College, Sivakasi, before becoming a full-time wildlife biologist in the mid-1970s.

Initially, he immersed himself in studying the dhole population's ranging patterns on the Sigur Plateau in the Nilgiris, refining his wildlife approach to work extensively on foot in elephant habitats. He adopted a unique field attire, wearing only sandals as a quick escape measure from potential elephant threats – a practice later adopted by Ajay and me during our studies. Mastering jungle craft and survival techniques with minimal modern equipment – only binoculars, a knife, and notebooks – AJT emerged as a quintessential field scientist by the late 1970s. His meticulous documentation of field notes during surveys, detailing observations with timestamps, set a rare standard among scientists.

AJT's tenure at the Wildlife Institute of India, facilitated by Dr M.K. Ranjitsinh, showcased his exemplary fieldwork, mentoring roles, and contributions to wildlife management. His legacy in shaping India's conservation policies remains profound. AJT's vision for wildlife, including species like the Nilgiri tahr and slender loris, continues to guide conservation efforts. Over three decades, AJT rose to Dean of the Wildlife Faculty at WII, his superior fieldwork influencing generations of wildlife biologists. His tenure at WII elevated forest officers nationwide, enhancing wildlife reserve management and species protection.

AJT played a pivotal role in mentoring numerous wildlife biology students from AVC College, guiding them to PhDs and prominent roles in premier institutions across India (BNHS, WII, WWF, SACON, IISc, ZSI, BSI) and internationally (IUCN, UNDP). His dedication to enhancing their language proficiency and field skills over years profoundly impacted generations of students.

At the Smithsonian Institution's Front Royal, USA, during his post-doctoral studies, AJT's rigorous fieldwork earned him admiration from international experts like Drs. Chris Wemmer, John Seidensticker, Rasanayagam Rudran, and Michael Steve. This exposure opened doors for numerous biologists, including Ajay and me, who underwent training programmes at Front Royal under his guidance.

AJT's contributions to wildlife conservation reshaped India's policy for landscape, leaving an indelible mark on the field. While his passing is deeply felt, AJT's legacy propels our conservation efforts forward, ensuring the preservation of wildlife species both in India and globally.

AJT's field diaries, containing comprehensive wildlife data, are a national treasure, invaluable for future biologists and policymakers. His deep understanding of Indian wildlife and dedication as a "jungle warrior" impacted many, including myself and Ajay Desai, during our elephant studies. "Be the first to spot the elephant, assess the wind direction, and plan an escape route within one minute if things go adverse. To plan that escape route, one should know the entire forest like the back of one's hand," were key rules AJT laid for Ajay and me. We survived with these techniques in elephant country.

His rapport with IFS officers of Tamil Nadu Cadre facilitated the implementation of projects on endangered species and protected area management. Respected by senior officers like Dr John Joseph, Mr S. Kondas, Mr M. Padmanaban, Mr J.C. Kala, Dr V.K. Melkani, Mr Promat Khan, Dr H. Malleshapa, and Dr Sukdev Thakkur of Kalakad-Mundanthurai Tiger Reserve, AJT held a special place as an icon of Tamil Nadu, revered across the nation.

My final meeting with Dr AJT was on January 20, 2020, at Mundanthurai Plateau. During our lengthy conversation at the rest house, he expressed concerns about invasive weeds threatening wildlife habitats, highlighting their role in escalating human-animal conflicts. This discussion, witnessed by forest trainees from Tamil Nadu Forest Academy, turned out to be his last imparted wisdom to them.

Soon, I will visit Mundanthurai Annex (Rest House), where AJT, Ajay Desai, and I spent over two years during the BNHS elephant project. This journey will reconnect me with our shared experiences and further my elephant studies. With Ajay gone earlier and now our mentor AJT, I remain the lone member of our team, reminiscing about our past endeavours.

Farewell, AJT Sir. My condolences to Mike and Merwin, AJT's sons. The entire country honoured your father, including the Hon'ble Chief Minister of Tamil Nadu, Government of Tamil Nadu. We must continue to champion AJT's vision for the wildlife of our country and the world. ■

– Dr N. Sivaganesan, Elephant Scientist,
Wildlife and Environment Trust

Latpanchar, a Birders' Paradise

Text: **Alok Ganguly**

ALOK GANGULY

Rufous-necked Hornbill (male)

Latpanchar is a small, sleepy Himalayan hamlet, primarily popular among bird enthusiasts, earning it the nickname Birders' Paradise. Located in the Darjeeling District of West Bengal, Latpanchar can be reached from New Jalpaiguri Railway Station, 44 km away, or from Bagdogra Airport in Siliguri, 49 km away. It takes less than two hours to reach Latpanchar from either location. The route from Siliguri to Latpanchar goes through Mahananda Wildlife Sanctuary, starting from Salugara, a military base, up to Kalijhora, where a steep road winds up to Latpanchar. Though the road from Kalijhora to Latpanchar (only 13 km) is poorly maintained, the surroundings are picturesque. As you travel, you may hear the chirping of birds and, if lucky, spot the lovely rufous-necked hornbill perched in the trees along the road. Even during peak tourist season in Darjeeling, traffic on the road to Latpanchar is minimal, allowing visitors to relax and enjoy the serene tranquillity of the place from any of the homestays here.

Latpanchar is also known for its cinchona plantations, from which chemicals for malaria medicines are extracted. It is said that the British first started cinchona plantations in Mangpo, which later spread to Latpanchar. As a seasoned Himalayan traveller who spent my childhood in Kashmir, the paradise on earth, I can truly say I have never encountered such a peaceful hill resort with such friendly inhabitants. Remarkably, almost every household here has a bird enthusiast. My mind simply desired to get lost in this beautiful Himalayan landscape.

Latpanchar is an extension of the Mahananda Wildlife Sanctuary, where all the birds found in the Himalayan region can be spotted if one is lucky. The rufous-necked hornbill, in particular, is abundant and can often be seen flying overhead or perching on nearby branches.During my visit, I stayed at a homestay with an open terrace on the second floor, offering an eye-level view of the treetops. The owner, Bikash Gurung – a skilled photographer

and bird watcher – guided me through the village for excellent bird-watching opportunities. On the day I arrived, Bikash and I had an adventurous afternoon. Initially, I planned to photograph birds from the terrace, but Bikash, excited by my camera, had other ideas. He pointed out a male hornbill perched on a tree branch at eye level from the terrace, explaining that the bird was collecting fruits for the female in its nest deep in the forest.

The nesting habits of hornbills are fascinating and much has been written about them in literature, so I will skip the details. David Attenborough wrote in THE LIFE OF BIRDS, "The female hornbill is very fussy about the nesting accommodation. To suit her, a tree hole has to be reasonably spacious. It must also have a chimney at the top that will serve as a bolt hole if attacked. Once she has selected it, she invariably improves it by plastering over any crevices or smaller holes. The material she uses varies according to her species."

In areas with a shortage of tree cavities, hornbills often fight among themselves and evict other birds, snakes, or even large monitor lizards to gain access to a cavity. The female is sealed inside, with a slit wide enough to pass food through but narrow enough to keep out predators. If a snake tries to enter, the female can fight it off with her bill. Female hornbills remain trapped inside the nest for three to five months while their eggs incubate and the chicks grow. During this time, the female and her young are totally dependent on the male for food. If something happens to him, the whole family often perishes.

On my first afternoon, Bikash invited me to accompany him into the forest for a photography session. We trekked through part of the hill and reached a spot teeming with various bird species. I was thrilled to find some long-tailed broadbills, cute birds with a loud, piercing whistle. To my astonishment, we also encountered a large male rufous-necked hornbill nearby, giving me ample opportunity to capture it in various poses. Bikash noticed the bird vigorously rubbing its beak against the branches, a behaviour he explained indicated the bird's displeasure at our presence. Respecting the bird's territory, we moved away.

Another interesting place in Latpanchar is Namthing Lake, or Pokhari, located in the Shelphu Hills of Darjeeling District at an altitude of 4,500 ft above sea level. This beautiful lake is home to several rare species, including the endangered Himalayan salamander, a tailed amphibian protected under Schedule II, Part I of the Indian Wild Life (Protection) Act, 1972. As a keystone species of the lentic habitats in the eastern Himalaya, the Himalayan salamander belongs to the ancient Salamandridae family, members of which existed in Europe during the Jurassic era. The forest department has strict

ALOK GANGULY

Rufous-necked Hornbill (female)

ALOK GANGULY

Black giant squirrel


ASIF N. KHAN

Chestnut-crowned Laughingthrush


ASIF N. KHAN

Rufous-bellied Niltava


ASIF N. KHAN

Yellow-throated Fulvetta

regulations to protect this area, with heavy fines or imprisonment for violators.

This part of the sanctuary, being hilly, features flora and fauna not often seen in the plains. My guide, Praveen, an encyclopedic source of information about the sanctuary, pointed out a black giant squirrel. This large tree squirrel is native to northern Bangladesh, north-eastern India, eastern Nepal, Bhutan, southern China, Myanmar, Laos, Thailand, Malaysia, Cambodia, Vietnam, and western Indonesia. Encountering this squirrel was a prized moment for me.

While returning from the sanctuary, we were flagged down by another bird enthusiast who pointed out a rufous-bellied eagle perched on a distant branch. I was fortunate to capture a photo of this endangered bird of prey, a small eagle 54–60 cm long, with broad rounded wings, a short broad tail, blackish upperparts and head, a white foreneck and breast, and a tail and flight feathers barred with dark. The rest of the underparts are chestnut, and males and females look alike.

Latpanchar is a perfect destination for birdwatchers seeking complete ornithological nirvana. The forest authorities have put up signboards at various places in Latpanchar strictly prohibiting the photography of nesting birds, with severe penalties, including fines and imprisonment, for violators. The National Audubon Society has provided guidelines for the dos and don'ts of bird nesting photography. The popularity of bird photography is growing, and advances in digital technology are easily accessible. Avoid photographing birds, especially during the nesting season when they are most vulnerable. Enjoy birding, but do so responsibly! ■

Alok Ganguly is an avid birdwatcher who enjoys spending his leisure time with his camera in wetlands and forests. The Himalaya have fascinated him since childhood.

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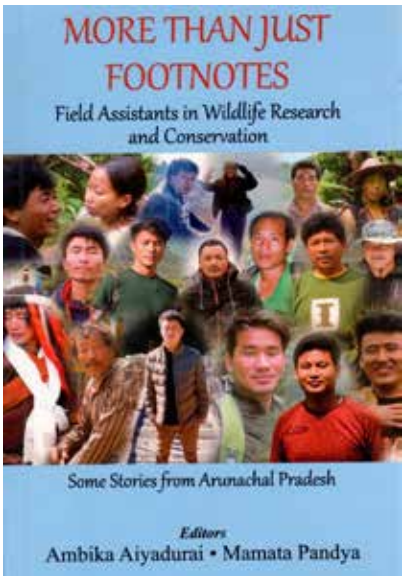


***More Than Just Footnotes*: Field Assistants in Wildlife Research and Conservation**

Edited by: Ambika Aiyadurai and Mamata Pandya
Published by: Bookwell Publication, New Delhi, 2023
Size: 21.5 x 14 cm
Pages: 202
Price: ₹ 980/-
Paperback

Reviewed by: **Asad R. Rahmani**

Before I read the book, the title intrigued me, and as I progressed through its pages, I found it aptly fitting. Memories of my own field assistants flooded my mind: Adishishya in Rollapadu, Andhra Pradesh; Parmar Singh (Munna) in Karera WLS, Madhya Pradesh; Bhagwat in Nanaj, Maharashtra; Aitanna in Sri Lankamalleswara WLS, Andhra Pradesh; Rathod Singh in Jaisalmer, Rajasthan; Mahindra Singh and Randheera in Keoladeo Ghana NP, Rajasthan; Mohammad in Banni, Gujarat; Bridesh Singh in the UP terai; and my driver-cum-field assistant, Mehboob Alam. They all contributed to my work, either in data collection or doing odd jobs. This book celebrates the indispensable role of field assistants in Arunachal Pradesh – a state known for its extraordinary biodiversity.

The book's blurb aptly captures its essence, "... contributions from the local community often lie buried in acknowledgements or as footnotes in the Ph.D. theses, books, reports, and scientific papers. These stories aim to bring these contributions to the fore." The editors, both accomplished in their respective fields as writers, communicators, and researchers, have successfully brought these contributions to the forefront in this book.

Besides the 16 chapters written by researchers, occasionally with their field assistants as co-authors, there are interesting interludes written by the field assistants in their earthy simple language. The editors have skilfully preserved the simplicity of the writers through their language editing. Additionally, there are box items that provide information that may not fit within the main chapter, such as *Plants for Livelihood* (p. 87), or *Red Giant Flying Squirrel* (p. 111). Given that many readers may not be familiar with Arunachal landscapes and names of valleys, rivers, hills, tribal names, etc., after each chapter there are notes such as *Study Landscapes*: *Communities and Conservation* that provide additional information. The inclusion of box items has added context to the chapters. I have been to Arunachal Pradesh several times, mainly in the plains, but do not know much about its geography, mountains, valleys, and tribes.

Another quality of the book is that each chapter reads like a personal narrative, recounting stories of journeys, struggles, and learning. It reminds me of my younger days … going to a new place, establishing contacts with locals, learning their language, customs, beliefs, cuisine, concerns, struggles of daily life, and local politics. This holistic approach enriches the fieldwork experience, broadening perspectives beyond the target species. I know many young researchers who hail from Bengaluru, Mumbai, or Kolkata often undergo a transformation in their perspective after working in remote parts of India. With time, the concern for a species or habitat, encompasses the survival and well-being of the local community.

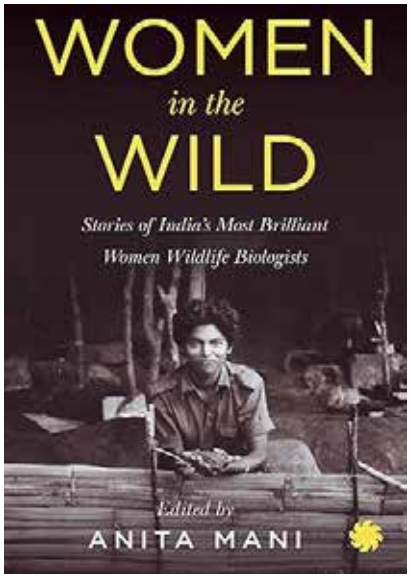
We all believe that Arunachalis kill animals for eating or decorating their huts. While this was common here until a few decades ago, it is changing like in rest of the country. I know several committed conservationists in Arunachal and other north-eastern states. Even if a few locals continue to hunt (illegal though under the Wild Life (Protection) Act), it is governed by traditions and is not reckless. Tana Tapi's, a forest officer and a committed conservationist, article *A Pledge to Preserve and Conserve Wildlife* (p. 163–169) illustrates this transformative shift. Likewise, Iho Mitapo story with Sahil Nijhawan (p. 139–147) emphasizes the importance of local field assistants. It is always a two-way learning process between a good researcher – and Sahil is one of them – and assistants. At times, distinguishing between a teacher

and a student becomes challenging. The boundary blurs, and we must acknowledge that we are all perpetual learners.

The cover featuring 18 field assistants is attention-grabbing, but unfortunately, it includes only one woman showcasing that our society has a long way to go before we bridge the societal gaps when men and women can work together, either as researchers, social scientists, or field assistants.

An important message from the book is that researchers should help the locals to further their career, and foster enduring relationships beyond the project's conclusion. For example, four of my field assistants were absorbed into the Forest Department, while some are now tourist guides. I am still in contact with most of them and frequently get the update of my former field study areas.

I thoroughly enjoyed the book and I believe you will too.



***Women in the Wild*: Stories of India's Most Brilliant Women Wildlife Biologists**

Edited by: Anita Mani
Published by: Juggernaut and Indian Pitta Books,
New Delhi, 2023
Size: 20 x 13 cm
Pages: 271
Price: ₹ 499/-
Paperback

Reviewed by: **Asad R. Rahmani**

For nearly 25 years, my quest for information on Jamal Ara, India's first woman ornithologist was fuelled after I read her papers in the *JBNHS* and *Newsletter for Birdwatchers*, and learning more about her work from Dr Sálim Ali and Mr J.C. Daniel. Her writings rose in the 1950s and 1960s, declined to some extent in the 1970s, and disappeared by the end of 1980s. Raza Kazmi's article, *The First Lady of Indian Ornithology* satisfied my academic curiosity.

I am a firm believer of gender equality; my 'Scientific and Popular Writing Course', conducted 16 times until now, I include a lecture on women scientists, which has one slide with scant details on Jamal Ara. Raza has managed to secure details of Jamal's life and a rare photograph of her from her partially blind daughter. How Raza found her daughter was interesting to read.

This book, featuring captivating stories on ten women field biologists, written by leading Indian conservationists, was long overdue. Some writers, for example, Zia Futehally, Prerna Bindra, and Neha Sinha also deserve recognition for their outstanding field work. The blurb acknowledges that the list is incomplete, and several Indian women biologists could be included. It is encouraging to see that one book cannot encompass all the women biologists of India because there are so many of them. There are many young women emerging in the field of conservation, and I hope their time will come as well.

Zai Whitaker's article *Turtle Girl*, on the work of J. Vijaya (1959–1987) is both fascinating and sad to read; her remains were found in Guindy National Park, Chennai, three months after she disappeared inexplicably. Zai has written a befitting article on J. Vijaya, detailing her life and mysterious demise

Teresa Rehman's chapter *An Ocean to Sky Expedition* explores the journey of Usha Ganguli, now Usha Lachungpa post marriage to Galden Lachungpa. Usha was a typical Mumbai girl, raised and educated in this large metropolitan city, far from nature. But her life took a transformative turn after she joined the BNHS in the early 1980s. We worked alongside in the Florican Project during the mid-1980s, and later in Grassland Ecology Project-Second Phase, in the 2000s. Her journey is a testament of grit, determination, freedom of choice, hard work, and perseverance – qualities I believe all Indian girls should aspire to embody. After marriage Usha relocated to Sikkim, where she spent 30 years working in the Sikkim Forest Department, retiring in 2017 as Principal Chief Research Officer, and Additional Director of the Sikkim Biodiversity Board.

Ananda Banerjee's essay on Vidya Athreya and her exciting work on

sugarcane leopards in Maharashtra is truly captivating. He begins the article with her field work in Shimla in September 2011, on a radio-collared female leopard named Charlotte. Ananda writes "In a field dominated by men, Athreya was one of the first women to conduct long-term research on big cats using radio-collars." I have heard Vidya's passionate lecture on the importance of understanding the needs of urban leopards whose habitats have been encroached upon by humans. Vidya is not only a pioneer in her field but also a good communicator of wildlife science to both the general public and decision makers.

Neha Sinha's article about Ghazala Shahabuddin, who initially aspired to be a veterinarian but ultimately became a field biologist, shed light on several aspects of Ghazala's life that were previously unknown to me. Trained as a zoologist, Ghazala became aware of human rights, environment, forest rights, and social welfare, during her college days, under the tutelage of Ashish Kothari of Kalpavriksh. Her journey took an early turn when, as an undergraduate student, she embarked on a ten-day trek to study the socio-ecological impacts of the Omkareshwar Dam. What a beginning? This experience marked the beginning of her unwavering commitment, to understanding the socio-economic reality of tribal and marginal people, using her scientific background as a tool for analysis. Her work on the oak forests of the Himalaya, their ecological and socio-economic roles, necessity of protecting them for the larger interest of Himalayan environment, has been published in both national and international journals. She is a strong supporter of protecting old-growth forests, particularly emphasizing the irreplaceable value of old trees like the oak, in providing habitats to a large number of species, a function that cannot be replicated by mono-culture plantations. She says "Losing oak forests is a metaphor for all threatened ecosystems replaced by other land uses or degraded habitats..."

Divya Mudappa, an M.Sc. from Pondicherry University, has made a significant impact through her work in the rainforests of the Western Ghats. Alongside her husband, an ecologist of equal repute, T.R. Shankar Raman, she established a field station in Valparai since 2001. Her long-term studies on small mammals, human-wildlife interactions, forest fragmentation, and the protection of tropical forests, have provided valuable insights into ecosystem resilience when given a chance by human beings.

Uma Ramakrishnan's genetic research integrates field and lab studies providing a crucial synthesis for conservation breeding, forensic science, taxonomy, and wildlife crime detective work. As a Professor of Ecology and Evolution with the National Centre for Biological Sciences (NCBS) at the Tata Institute of Fundamental Research in Bengaluru, she focuses on biological matter, generally animal poop and hair/feather, to understand the ecology of threatened species. She has helped estimate tiger populations through the analysis of tiger scats by identifying individual tigers using genetic techniques. Prerna Singh Bindra, a renowned conservationist, has written the chapter on Uma Ramakrishnan by titled *India's Wildlife Detective*: *Decoding Wildlife Mysteries Through Genetics*.

Anita Mani, the editor of this book, introduces Nandini Velho's work in Arunachal Pradesh and Goa. Nandini is a remarkable lady, embodying a diverse range of role including field biologist, activist, nature educator and writer and designer of the interpretation centre at Pakke Tiger Reserve. Her passion of the natural world was nurtured during her childhood in Goa, where she was surrounded by nature, and fascinated by the colours of Malabar trogon. One of her well-known study was on the interactions of hornbills, rodents, and fruiting trees in Pakke TR. To learn more about Nandini's achievements and pioneering studies, read the chapter dedicated to her in this book.

Next chapter, *Like a Fish to Water*, explores Divya Karnad's captivating work with fish, a topic often overlooked by most field biologists. While Government fishery departments focus primarily on fish exploitation, Divya highlights the pressing need for fish protection, especially since 327 species out of 868 fish species in India are classified as threatened on the IUCN Red List). After completing her masters in NCBS, Divya initially studied sea turtles, particularly examining the impact of artificial lights on beaches. However, her conservation approach took a significant turn when she encountered the struggles of the poor fishermen near Rushikulya, Odisha; their livelihood challenges deeply affected her perspective –a fascinating story in this book that is worth reading.

The final chapter by Purva Variyar titled *Breaking New Ground* is truly the icing on the cake. It highlights the work of Dhanusha Kawalkar and

three other young women, who are taking up studies on lesser studied species and habitats. Despite the existence of magnificent caves in central India, the Northeast and Andaman & Nicobar, caves remain one of the least understood habitats. Ravi Sankaran studied Edible-nest Swiftlets in Andaman in caves, focusing on birds that happened to use caves for nesting; his student, Shirish Manchi continued the study. Through this chapter, I learned that Dhanusha is studying the ecology of the cave-dwelling swiftlets. She mapped the biological diversity inside the limestone caves of the Andamans with her team. I had the opportunity to explore one of these caves in Chalis-eak in the Andamans, a decade ago when another girl, Akshaya Mane, was working on the edible-nest swiftlet at that time. Dhanusha co-founded the Speleological Association of India, an NGO, in 2021. As the chapter concludes, "And Kawalkar has only just begun."

Ayushi Jain is working on the Asian giant soft-shell turtle, Tiasa Adhya is focussed on Fishing cat, and Pooja Choksi is studying the vocalization of animals. Any country would be proud of these four young women who have decided to pursue their passion, despite facing family and societal pressures to pursue conventional careers. Given the success of these wonderful women, I am confident that their families will indeed be proud, as all Indians should be.

I will recommend this book to be read in every school, every college, and university to inspire young people of all genders.

Buzz about a Baza

I was at the foothills of Dalma on the outskirts of Jamshedpur in Jharkhand. Two fellow birders were photographing black-naped monarchs on a bush to their left and a rufous woodpecker in front. I sensed movement behind and saw a bird, bigger than a pigeon, perched silently on a tree. Its orange eyes and broad horizontal stripes on the belly made an experienced birder exclaim, "Jerdon's baza, a lifer for me!" I could not see the characteristic crest before the bird flew away. We pursued it and caught a glimpse of its crest, which stuck out like a unicorn's horn.

On our way back, we shared the sighting with our friends in the Jamshedpur Birding Group, causing great FOMO (fear of missing out). There had been just one sighting of Jerdon's baza in Jharkhand, back in 2022. We wondered if the bird was migratory in this region and looked up available information. Jerdon's baza, a medium-sized raptor, is resident and widely distributed in Southeast Asia. According to books, its distribution in India seemed limited to the Northeast and the Western Ghats, but eBird observations showed sightings along eastern India.

Jerdon's baza *Aviceda jerdoni* is named after Thomas Caverhill Jerdon (1811–1872), an English physician, zoologist, and botanist. Many species of birds and plants are named after him. Jerdon documented more than a thousand species of Indian birds. Despite his meticulous work, Jerdon was careless with money and rash in his actions. He was nearly throttled by his pet python once and, on another occasion, bitten by a cobra. He quickly slashed off his fingertip with a pocket knife to prevent the spread of the poison. We found both the bird and the naturalist interesting and out of the ordinary.

After a sleepless night of excitement, seven of us returned to the same site early in the morning. We were rewarded with clear sightings of the bird, its crest cocked up, and even captured in-flight photographs. One birder thrust his fist in the air, singing, "I saw a baza, I saw a baza," while another danced in circles. Two first-timers wondered, 'how can a bird bring so much joy?' Perhaps there is a bit of Jerdon's quirkiness in every birder.

On our return, we decided to visit the Dalma range more frequently to determine whether Jerdon's baza is a resident or a vagrant from the Northeast. Birdwatching in small groups is more rewarding with more eyes to spot and ears to listen. The shared joy of sighting a rare bird is something to be experienced, not explained.

– Vijaya Bharat
Jamshedpur

Blue and white flycatcher spotted in Matheran

On March 12, 2024, I was quickly scrolling through my WhatsApp groups when a message caught my eye. It was from my fellow birders, announcing the sighting of the rare blue-and-white flycatcher at Matheran, a hill station near Mumbai.

For bird enthusiasts across India, this was a thrilling rarity. Captivated by the beauty of this bird, I decided to gather all the information I could before visiting Matheran.

The blue-and-white flycatcher *Cyanoptila cyanomelana*, also known as the Japanese flycatcher, is a highly migratory bird. Adult males boast a vibrant blue back, white belly, and black face, throat, and breast, while females are brown all over.

This bird breeds in Japan and the north-eastern Asian mainland, including Korea, parts of north eastern China, and Russia. In winter, it migrates to Southeast Asia, frequenting Vietnam, Cambodia, Thailand, Borneo, and Java. It has also been spotted as a vagrant in other parts of the Indian subcontinent, such as the Sinharaja Rainforest in Sri Lanka and Jigme Singye Wangchuck National Park in Bhutan. In India, there have been sporadic winter sightings since 2012 in Maharashtra, Karnataka, Kerala, Tamil Nadu, Madhya Pradesh, Arunachal Pradesh, and the Andaman Islands.

As a dedicated birder and photographer, I could not resist the opportunity to see this rare beauty. So, on March 14, 2024, I headed to Matheran. Despite having a precise location, spotting the bird was challenging.

I waited patiently for about four hours in the same spot. Finally, my patience paid off. I saw the flycatcher and managed to take numerous photos from every angle.

It was an unforgettable experience to witness this rarity in action.

All photos were taken with a Nikon D7500 paired with a 500 mm PF prime lens.

– Sachin Pawar
Maharashtra

A Day in Pench

Text and Photographs:
Manan Singh Mahadev

I live in the land of 'Silly Harry'. Legend has it that a whimsical British officer named Harry once resided in the woods of Pench, now a well-known tiger reserve in Maharashtra, India. His quirky ways earned him the moniker 'Silly Harry', and the area where he lived came to be called Sillari, which is my current base. This area, close to the Pench River, which the tiger reserve is named after, has a healthy population of vultures and is highly suitable for initiating vulture conservation projects.

As a passionate vulture conservationist, I had the privilege of transporting ten Indian vultures *Gyps indicus* from the Vulture Conservation Breeding Centre in Pinjore, Haryana, to a specially constructed aviary on the edge of Pench Tiger Reserve in January 2024. These raptors are set to be released into the wild in a designated Vulture Release Zone, a 100 km radius around the aviary – the average distance travelled by a vulture in a single flight – in the coming weeks. My team and I work to ensure the environment is conducive for their release, involving strong advocacy and awareness programmed with local stakeholders (villagers, the Forest Department, Animal Husbandry Department, Food and Drugs Administration, etc.) to eliminate NSAID poisoning threats from diclofenac, aceclofenac, ketoprofen, and nimesulide, with the first three banned. Additionally, we conduct periodic raptor surveys and monitor NSAID prevalence in the region through road transects, dump surveys, pharmacy surveys, and cattle carcass sampling, with the help of the Forest

Pench Tiger Reserve derives its name from its life line – the River Pench

Department, to evaluate the impact of these programmes and meetings. These activities help us understand the avifaunal diversity and scavenger communities in this part of the Vidarbha landscape.

My day begins with scanning the skies for vultures and other raptors as I head to the aviary from my base, roughly 25 km away. Along the way, I often see large herds of chital, sambar, gaur, and occasionally a tiger or leopard. At the aviary, my team and I interact with the Forest Department staff who look after the vultures. I monitor the birds' activities through CCTV with the help of the staff until late afternoon, then leave for lunch and prepare my daily report.

White-rumped Vulture

One routine day, during monitoring, we noticed a vulture perching on the ground, isolated from its flock and unable to fly. We acted quickly, moving the bird to a temporary aviary to reduce stress, and began treatment with the reserve's veterinarian. After a tense month, the bird recovered, and we released it back into the main aviary, much to everyone's relief.

My evenings are typically spent reading research literature, connecting with government officers and local partners to arrange awareness programmes in villages, or listening to my favourite songs while preparing for the next day with my colleagues as the situation demands. Working on this BNHS project has been immensely rewarding. I have had the chance to work in one of my favourite tiger reserves, interact with vibrant local communities, and contribute to the conservation of critically endangered vultures. It is my dream to see them re-establish Pench Tiger Reserve as their home. ■

Manan Singh Mahadev, a Conservation Biologist, is working with BNHS's Vulture Programme since March 2020. He is currently implementing the vulture release programme in Pench Tiger Reserve, Maharashtra.

BNHS PHOTO LIBRARY

How safe are the Vulture Safe and Release Zones?

Text: **Kishor Rithe**

The population of Gyps species—including the white-rumped vulture (Oriental white-backed), Indian vulture (long-billed), and slender-billed vulture – started declining in the mid-1990s throughout the Indian subcontinent. The BNHS published its findings on this decline in the *Journal of the Bombay Natural History* in 1999 and has since been working to bring these species back from the brink of extinction. BNHS scientists spent years determining the cause of these mass declines. They explored all likely reasons, including road and railway kills, increased livestock meat export due to more slaughterhouses, and poaching of birds for their derivatives, but none explained the drastic fall in numbers. A breakthrough paper published in *Nature* in 2004 proved that the non-steroidal anti-inflammatory drug (NSAID) diclofenac was causing the decline in Gyps vultures in the Indian subcontinent (see "Race to Save Vultures" by A.R. Rahmani in *Hornbill*, Oct–Dec 2008). Diclofenac is a veterinary NSAID widely used in livestock treatment. BNHS scientists conveyed these findings to the Government of India (GoI). Finally, in 2006, the GoI decided to impose a ban on the veterinary use of diclofenac, with a gazette notification issued in 2008.

Simultaneously, BNHS and Royal Society for the Protection of Birds (RSPB) initiated a conservation breeding programme for vultures to ensure a captive population that could be released into the wild to bolster the wild population. BNHS and RSPB set up four Jatayu (Vulture) Conservation Breeding Centres (JCBC) across the country in partnership with the governments of Haryana in Pinjore (2001), West Bengal in Rajabhatkhawa (2005), Assam in Rani, Guwahati (2007), Madhya Pradesh in Van Vihar, Bhopal

(2011). At these centres, BNHS scientists have bred more than 700 birds in captivity since 2004, greatly contributing to securing the future of vultures in India. This programme was made possible with support from the MoEF&CC, state governments, and RSPB. (see "Steps to Save Jatayu" in *Hornbill*, April–June 2023).

After almost 20 years of hard work, some JCBCs have reached the stage of providing vultures for release and breeding in different states. The Jatayu Conservation Breeding Centre (JCBC), Pinjore, designated as the coordinating zoo for the Vulture Conservation Breeding Programme, currently houses 381 vultures of the three Critically Endangered resident Gyps species. It has provided 60 birds to VCBC or JCBC Bhopal for breeding (36 white-rumped and 24 long-billed), 20 birds to a private zoo in Gujarat for breeding, 20 vultures to Maharashtra for release, and has already released 8 birds in Haryana. The Bhopal centre, at Van Vihar National Park, became operational in 2014 and has since increased its population to 66 white-rumped and 51 long-billed vultures through the breeding programme. VCBC or JCBC Rani Assam has raised 128 white-rumped and slender-billed vultures. VCBC or JCBC West Bengal has raised 155 birds of the white-rumped, slender-billed and Indian vultures, and released 31 birds in stages (2021–23).

The Vulture Conservation Breeding Programme has been successful in India, producing more than 700 vultures in captivity, providing 80 birds for breeding, and 59 birds for release into the wild to build the wild population. Citizen science (State of India's Birds report 2023) surveys have already recorded a steady and increasing population trend in protected areas due to the improved effectiveness of our protected area network, especially the tiger reserves, where anthropogenic pressures have been greatly reduced probably due to village resettlement and an increase in prey and predator populations.

The vulture breeding and release programme will only be successful when a conducive, vulture-safe environment is created through the Vulture Safe Zone (VSZ) programme, coordinated by central and state government agencies.This can help the existing wild vulture population beyond protected areas to flourish in India by providing safe carcasses to the wild and released vultures.

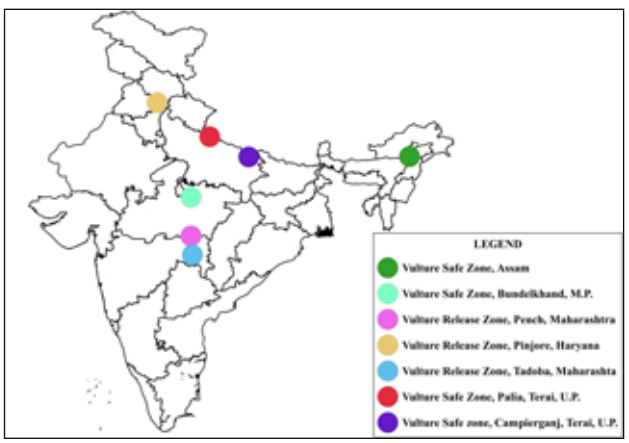
Government Ban on NSAIDs to Save Jatayu

Over the past two decades, BNHS has been working on safety-testing veterinary drugs and implementing policies for veterinary NSAIDs with support from the Indian Veterinary Research Institute (IVRI), RSPB, GoI, and the state governments of Haryana, Madhya Pradesh, West Bengal, and Assam. After an exhaustive study, scientists have identified diclofenac, aceclofenac, nimesulide, and ketoprofen as toxic to vultures, and meloxicam and tolfenamic acid as safe alternatives.

Due to strong follow-up by BNHS, the final gazette notification in 2008 ensured a ban on diclofenac. On July 23, 2023, the Union Ministry of Health and Family Welfare of the Government of India issued a notification formally banning the manufacture, sale, and distribution of ketoprofen and aceclofenac and their formulations for animal use under Section 26A of the Drugs and Cosmetics Act, 1940 (23 of 40). The Drugs Technical Advisory Board (DTAB) also recommended banning nimesulide and suggested forming a subcommittee to examine drugs that could affect animal health or the environment and submit a report for appropriate action. However, the real challenge now lies in implementing the notification, which BNHS has started at the state level through its Vulture Safe Zone (VSZ) and Vulture Release Zone (VRZ) programmes.

Vulture Safe Zone Programme

The Vulture Safe Zone (VSZ) programme was launched by the BNHS in collaboration with other agencies, including state governments and Royal Society for the Protection of Birds (RSPB). The program aims to create safe feeding grounds for vultures that are free from vulture-toxic NSAIDs. To achieve this, it is crucial to prevent the use of these drugs, particularly in areas with existing vulture populations, through local conservation



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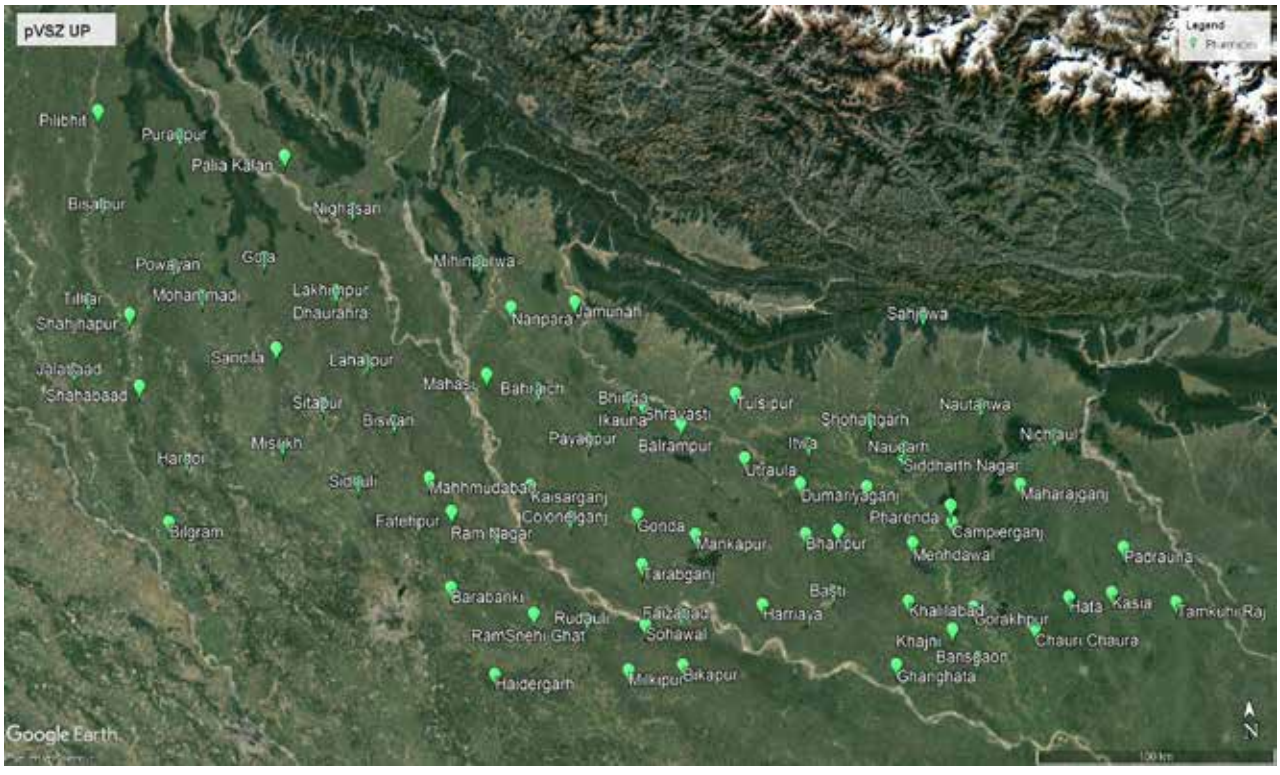
Vulture Safe Zones in India



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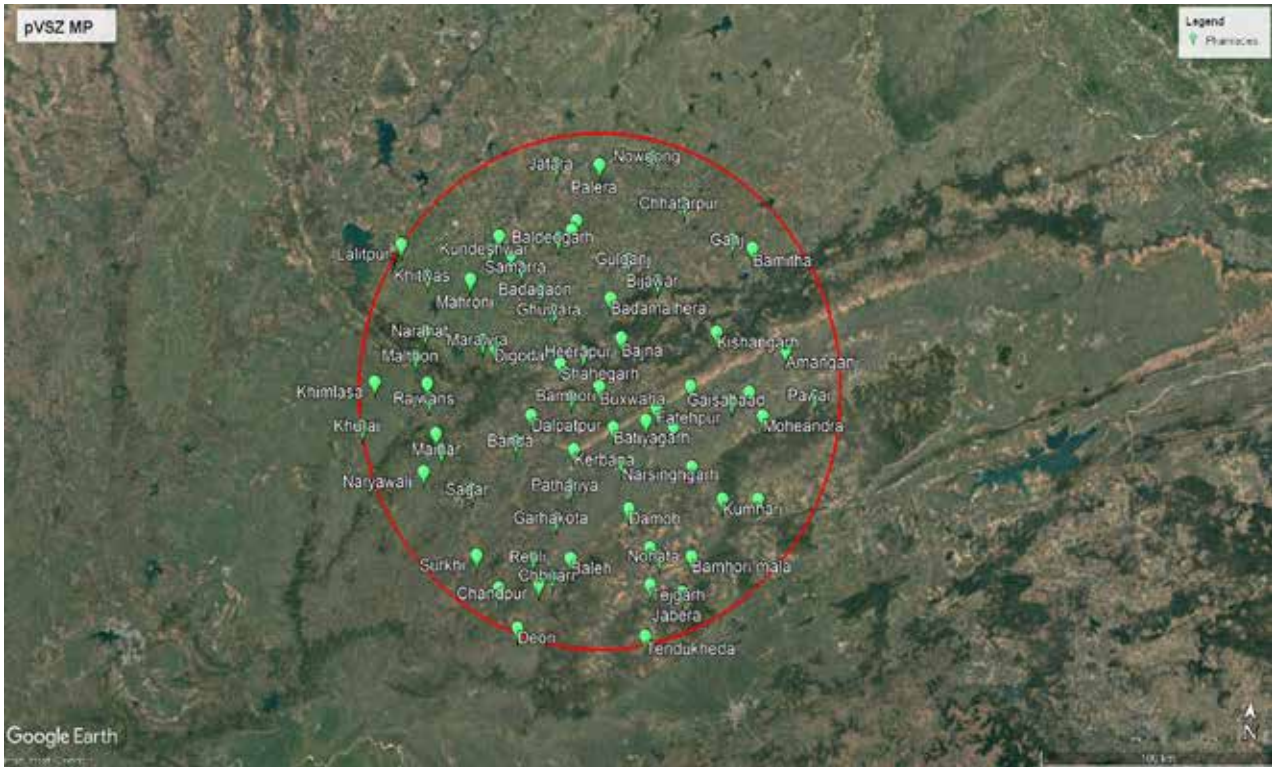
Proposed Vulture Safe Zone for Uttar Pradesh

efforts. BNHS began implementing the VSZ program in Assam (2013), Madhya Pradesh (2014), Uttar Pradesh (2015–2016), and recently in Maharashtra (2023), focusing on selected districts within these states to ensure NSAID-free food for wild vultures and to establish safe landscapes for releasing captive-bred vultures.

The objective of this progamme is to establish baseline information on the vulture populations and their trends, ascertain the prevalence of various veterinary NSAIDs in the area, monitor this prevalence over time, carry out advocacy and awareness with various stakeholders to minimize the use of vulture-toxic drugs. BNHS teams based in Uttar Pradesh, Madhya Pradesh, Assam, and Maharashtra conduct studies with the objective of making a 100 km radius area (the average area which a vulture can travel in a day in search of food) free of NSAIDs like diclofenac, aceclofenac, and ketoprofen. The teams regularly monitor free-ranging vulture populations through road transect surveys, counting nests, fledglings, and vultures at foraging sites.

Food is a critical resource for scavenging species like vultures as they depend entirely on carrion, feeding on the carcasses of large wild and domestic herbivores. Regular monitoring of food availability is essential to ensure that there is sufficient food to sustain the existing population. An average resident Gyps species of vulture, weighing around 5 kg, requires approximately 90–100 kg of meat per year, excluding the weight of bones and hide. Additionally, the BNHS teams conduct pharmacy surveys, carcass sampling, and community engagement and awareness programmes for cattle owners and villagers around vulture nesting colonies in the VSZs. Surveyors, posing as cattle owners, visit pharmacies and buy the first drug

Name of VSZ	No of Districts /tehsils covered	Pharmacies surveyed	NSAID offered	Non-NSAID	Refused without prescription
VSZ UP	17 (76 tehsils)	76	60	2	14
VSZ MP	6	73	61	1	11
VSZ Assam	29	99	87	0	12
VSZ Maharashtra	11	102	95	4	3
VRZ Meghalaya	3	7	6	0	1
Total	**66**	**357**	**309**	**7**	**41**



MAP DEVELOPED BY MANAN SINGH MAHADEV

Proposed Vulture Safe Zone for Madhya Pradesh

offered for treating injured cattle, and record location and details of the pharmacies discreetly.

Findings: BNHS has surveyed 100 km radius VSZ areas in Uttar Pradesh, Madhya Pradesh, Assam-Meghalaya, and Maharashtra. A total of 450 pharmacies were surveyed by the BNHS team in these areas, of which 343 offered NSAIDs, 27 offered non-NSAIDs, and 40 refused drugs without a veterinary prescription (see table on p. 34).

Despite a decrease in diclofenac, aceclofenac, and ketoprofen sales, the high prevalence of nimesulide and piroxicam remains a concern, as these drugs are not banned by the Government of India. BNHS surveys indicate that the existing vulture population is still at risk from NSAID poisoning indicating a need for advocacy efforts on increasing the use of meloxicam and tolfenamic acid (see table below). Other drugs offered included mefenamic acid and phenylbutazone, and two pharmacies offered antibiotics in VSZ Uttar Pradesh.

Name of VSZ	Nimesulide %	Piroxicam %	Aceclofenac %	Meloxicam %	Tolfenamic Acid %
VSZ UP	43	38	5	10	4
VSZ MP	34	54	-	12	-
VSZ Assam	8	-	16	64	6
VSZ Maharashtra	45	4	-	41	-
VRZ Meghalaya	80	-	-	20	-

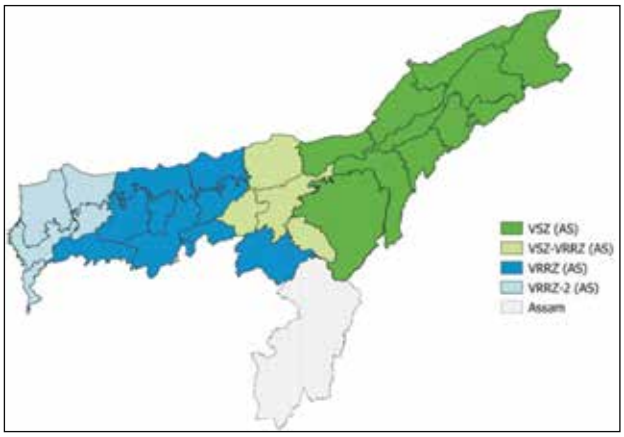
VSZ Madhya Pradesh

The surveys revealed a significant decline in the use of diclofenac and aceclofenac, but a high prevalence of unbanned vulture-toxic nimesulide (34%). The prevalence of vulture-safe drugs like meloxicam 12% and tolfenamic acid 0% remained low, indicating a need for future advocacy to promote these safer alternatives.

Meloxicam was sold by 12% of pharmacies, either in pure or combined form with paracetamol, in bolus and injectable forms. Piroxicam was the most popular drug, available in bolus and injectable forms in 54% of pharmacies. Nimesulide was offered by 34% of pharmacies, in bolus and injectable forms.

VSZ Assam

The VSZ programme has been implemented in the districts along both the northern and southern banks of the Brahmaputra River. For future vulture



MAP DEVELOPED BY SACHIN RANADE

Proposed VSZ, VRZ, and VRRZ for Assam

reintroduction, the Vulture Release & Reintroduction Zone (VRRZ) is proposed in an additional six districts of western Assam, seven districts of central Assam, and three districts in northwest Meghalaya.

During the survey, seven distinct NSAIDs and various other pharmaceuticals were obtained. Meloxicam was the predominant drug of choice within this zone. The VSZ programme also covers four common districts between the VSZ and Vulture Release and Reintroduction Zone (VRRZ). Undercover surveys were conducted across 29 districts in Assam and 3 districts in Meghalaya.

In 2023–2024, a pharmacy survey in Assam recorded 2% prevalence of NSAIDs like piroxicam and ibuprofen for which safety assessments have not yet commenced, categorized as uncertain.

Vulture Release and Reintroduction Zone, Assam

The VRRZ-1 region encompasses 12 districts situated along both the northern and southern banks of the Brahmaputra River. In the survey, five distinct NSAIDs were obtained. Meloxicam was identified as the most favoured medication in this zone. In VRRZ-1 and 2, 57% of the NSAIDs obtained were safe, 39% were classified as unsafe, and 7% were categorized as uncertain.

Vulture Release and Reintroduction Zone, Meghalaya

This area encompasses three districts situated within the Garo Hills region of Meghalaya. Two distinct NSAIDs were obtained during the survey. Nimesulide was identified as the most favoured NSAID in this zone, with a slight preference for meloxicam as well. Within the VRRZ (Meghalaya), 80% of the acquired NSAIDs were determined to be unsafe, while 20% were deemed safe. The sample size was very small.

The VSZ and VRZ showed a positive trend in the preference for safe drugs like meloxicam and tolfenamic acid.

VSZ Maharashtra

In January 2024, the Government of Maharashtra launched the Rajyastariya Jatayu Samvardhan Prakalp (State Level Vulture Conservation Project), re-wilding 20 captive-bred vultures in Pench and Tadoba-Andhari Tiger Reserves. To ensure a safe environment for these vultures, a covert pharmacy survey was conducted in April 2024 in 106 talukas/tehsils across eight districts in Vidarbha (Maharashtra) and two districts in Madhya Pradesh. Nimesulide was offered by 45% of pharmacies, whereas the vulture-safe drug meloxicam is also preferred by 41% of pharmacies.

Natural VSZs More Safe

Over the past 20 years, India's tiger reserves have achieved remarkable success. The National Tiger Conservation Authority reports a significant increase in the tiger population. Several villages within tiger reserves like Melghat and Tadoba in Maharashtra, and Satpuda and Kanha in Madhya Pradesh, among others, have been relocated, creating NSAID-free areas of 1,500–2,500 sq. km. These areas harbour wild prey free from NSAIDs.

The BNHS has signed an agreement with the Government of Maharashtra and is in discussions with the Forest Departments of Rajasthan, Assam, and Madhya Pradesh to utilize these inviolate areas to release captive-bred vultures from BNHS-run conservation breeding centres. The Forest Department of Maharashtra is collaborating with BNHS to release 20 white-rumped and Indian vultures in TATR and PTR. Potential release areas in Maharashtra include Pench, Tadoba, and Melghat TR. ■

Kishor Rithe, Director, BNHS, has been working for wildlife conservation through sustainable livelihoods, conservation action, advocacy, and policy for over three decades.

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